
PONY
سلسلة كتب الأستاذ
MATH
2025
6
PRIMARY
FIRST TERM

Contents

Theme 1

Numerical Sense and Operations (Expressions and Equations)

Theme 2

Mathematical Operations and Algebraic Thinking

(Statistics and Data Analysis)



Divisibility, Factors, and Multiples



Divisibility, GCF, and LCM

Lesson 1 Divisibility

Learning Objective:

By the end of this lesson, the student will be able to:

- Deduce divisibility by 2, 3, 4, 5, 6, and 10.

Lesson 2 Factorizing a Number to Its Prime Factors

Learning Objective:

By the end of this lesson, the student will be able to:

- Decompose a number into prime factors to find the greatest common factor and the least common multiple.

Lesson 3 Writing Expressions Using the GCF

Learning Objectives:

By the end of this lesson, the student will be able to:

- Write mathematical expressions that contain the greatest common factor.
- Imagine how a numerical expression that represents two integers in the form of a multiple of the sum of two integers can be represented in life position.

Lesson 4 Analyzing Least Common Multiples

Learning Objectives:

By the end of this lesson, the student will be able to:

- Analyze the operations of adding and subtracting fractions and find the product of these operations.
- Use the least common multiple to form a common denominator.



Divisibility

Remember

- The odd numbers are: 1 , 3 , 5 , 7 , 9 , 11 , ………………….
- The even numbers are: 0 , 2 , 4 , 6 , 8 , 10 , 12 ………………….

Divisibility

15 ÷ 3 = 5 R 0 So, 15 is divisible by 3

15 ÷ 2 = 7 R 1 So, 15 is not divisible by 2

Any number is divisible by another, if the remainder of the division operation is zero.

1 **Complete the following table:**

	Division	Quotient	Remainder	Divisible/ Not Divisible
Ex.	45 ÷ 5	9	0	45 is divisible by 5
Ex.	25 ÷ 4	6	1	25 is not divisible by 4
a	60 ÷ 7	…………	…………	60 is ………………… by 7
b	35 ÷ 4	…………	…………	35 is ………………… by 4
c	28 ÷ 7	…………	…………	28 is ………………… by 7
d	120 ÷ 4	…………	…………	120 is ………………… by 4
e	29 ÷ 5	…………	…………	29 is ………………… by 5
f	18 ÷ 6	…………	…………	18 is ………………… by 6

Determine Divisibility Without Performing Division

Divisibility by 2

- A number is divisible by 2 if:

Its Ones digit is (0 , 2 , 4 , 6 or 8) "an even number"

For example: 78 , 292 , 1,654 are divisible by 2

Even Numbers

Divisibility by 3

- A number is divisible by 3 if:

The sum of its digits is divisible by 3 without a remainder. In other words, the sum of the digits is a multiple of 3, such as 0, 3, 6, 9, and so on.

For example: **The number 582 is divisible by 3,**

because 5 + 8 + 2 = 15, and 15 is a multiple of 3.

Divisibility by 4

- A number is divisible by 4 if :

The Ones and Tens digits of the number are divisible by 4, or if the number ends with '00'.

In other words, its Ones and Tens digits should be multiples of 4, such as 0, 4, 8, 16, etc.

For example:

- **5,124 is divisible by 4** because 24 is divisible by 4.
- **300 is divisible by 4** because its Ones and Tens digits are '00'.

Divisibility by 5

- A number is divisible by 5 if :

Its Ones digit is either 0 or 5.

For example:

- **870 is divisible by 5** because its Ones digit is 0.
- **2,635 is divisible by 5** because its Ones digit is 5.

Divisibility by 10

- A number is divisible by 10 if:

  Its Ones digit is 0 .

For example: 360 , 2,130 is divisible by 10 because its Ones digit is 0.

Divisibility by 6

- A number is divisible by 6 if it is divisible by both 2 and 3.

or, the number whose Ones digit is even and the sum of its digits is divisible by 3 is divisible by 6.

For example:

- **102 is divisible by 6:**

  because its Ones digit is 2, which is even, and the sum of its digits (1 + 0 + 2) is divisible by 3.

- **375 is not divisible by 6:**

  because its Ones digit is odd and the sum of its digits (3 + 7 + 5) is not divisible by 3.

2 **Circle the number which is divisible by 2:**

30	65	97	54	258
45	212	127	641	654
26	151	368	6,530	4,261

3 **Circle the number which is divisible by 3:**

45	36	28	456	2,005
154	368	554	1,002	12,748
558	652	100	58	10,002

Theme 1

4 **Circle the numbers which are divisible by 5:**

45	36	250	156	558
154	830	945	630	354
101	2,005	12,748	55,551	2,003

5 **Use the following numbers to complete:**

335 342 531 250 315 702 600

a) The numbers which are divisible by 2: ....

b) The numbers which are divisible by 3: ....

c) The numbers which are divisible by 5: ....

d) The numbers which are divisible by 6: ....

e) The numbers which are divisible by 10: ....

6 **Complete the following table using (✓) or (✗):**

	Number	Divisible by...					
		2	3	4	5	6	10
Ex.	45	✗	✓	✗	✓	✗	✗
a	32	......	......	......	......	......	......
b	24	......	......	......	......	......	......
c	30	......	......	......	......	......	......
d	126	......	......	......	......	......	......
e	130	......	......	......	......	......	......
f	120	......	......	......	......	......	......
g	456	......	......	......	......	......	......



The relationship between divisibility and (factors & multiples):

Ex. **The factors of 12** are 1, 2, 3, 4, 6 and 12.

So, the number 12 is divisible by any of these factors,

Ex. **The multiples of 5** are 0, 5, 10, 15, 20, ...

So, any of these multiples are divisible by 5,

Therefore, factors and multiples can be used to determine numbers that are divisible without remainder.

Ex. 25 is divisible by 5 because:
25 is a multiple of 5 or 5 is a factor of 25.



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1 Choose the correct answer:

a .... is divisible by 3. (2,134 or 1,026 or 146 or 37)

b .... is divisible by 10. (1,024 or 2,009 or 6,900 or 105)

c .... is divisible by 4. (54,653 or 7,593 or 836 or 4414)

2 Answer the following:

a Any number is divisible by itself, except ....

b Any number is divisible by 5 if its Ones digit is .... or ....

c The smallest number which is divisible by 2 and 3 is ....

d The smallest 2-digit number and divisible by 4 is ....

e Write down three numbers that are divisible by both 3 and 5 (common multiples). .... , ... , ...

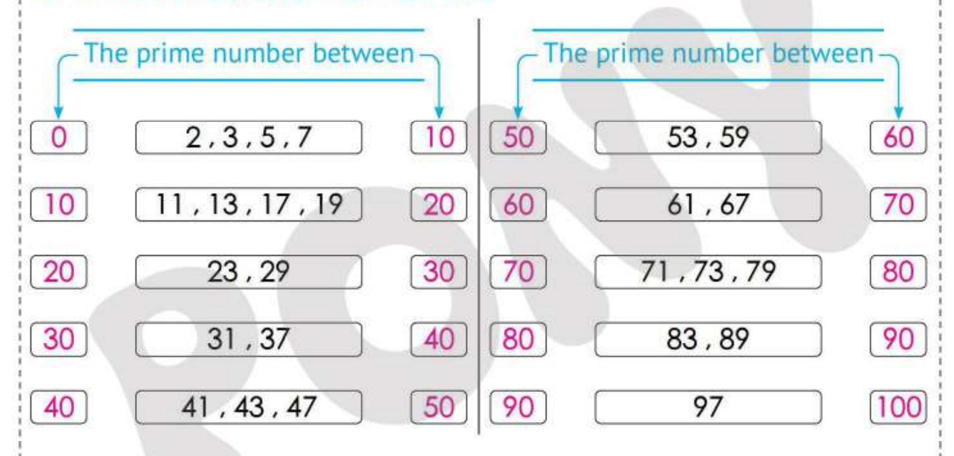


Factorizing a Number to Its Prime Factors

Remember

The prime number: Is a number greater than one and has only two factors, one and the number itself.

- All prime numbers are odd, except 2.
- The smallest prime number is 2.
- The only even prime number is 2.
- The smallest odd prime number is 3.
- 1 is neither a prime number nor a composite number.
- Prime numbers less than 100 are:



	The prime number between			The prime number between	
0	2 , 3 , 5 , 7	10	50	53 , 59	60
10	11 , 13 , 17 , 19	20	60	61 , 67	70
20	23 , 29	30	70	71 , 73 , 79	80
30	31 , 37	40	80	83 , 89	90
40	41 , 43 , 47	50	90	97	100

- Any number is a factor and a multiple of itself, except zero.

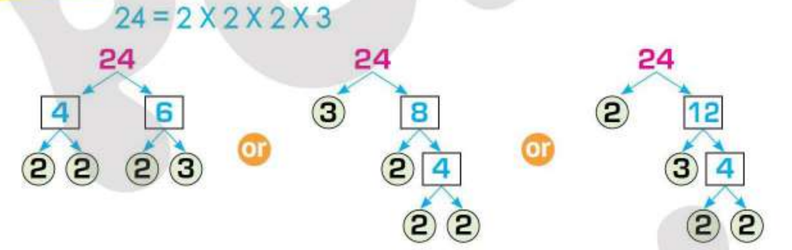
Prime factorization

Means writing the composite number as the product of prime numbers.

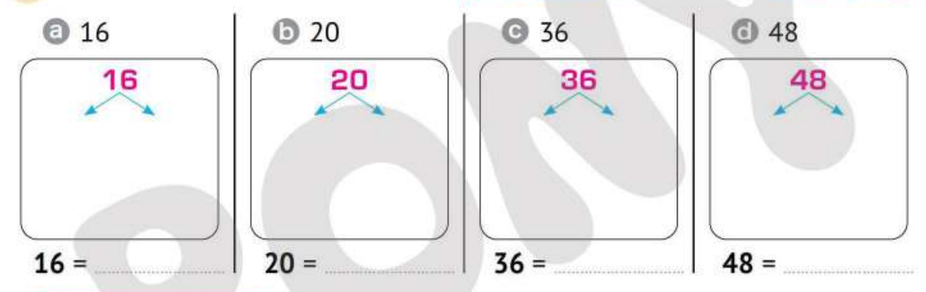
Ex. Factorize 24 into its prime factors:

1. Choose two numbers whose product is 24 (1 should not be used).
2. Circle the prime numbers and leave them, then continue factorizing the composite numbers.
3. Stop when all numbers become prime numbers.

Note that: All the following are true, and we get the same result:
$24 = 2 \times 2 \times 2 \times 3$



1 Factorize each number into its prime factors using the factors tree:



16 = ...

20 = ...

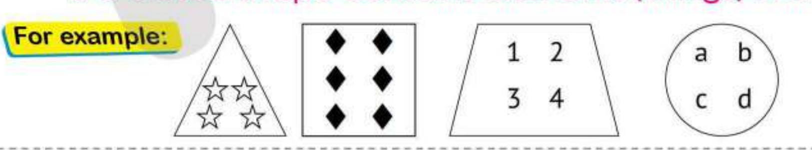
36 = ...

48 = ...

Venn Diagram

Is a closed shape contains elements (things) in it.

For example:



Find the GCF and LCM Using a Venn Diagram

We can find the GCF and LCM of two numbers using a Venn diagram by following these steps:

Ex. Find the GCF and LCM for 18 and 12 using a Venn diagram:

1. Factorize the two numbers into their prime factors using the factors tree.

18 → 6, 3; 6 → 3, 2
18 = 2 X 3 X 3

12 → 4, 3; 4 → 2, 2
12 = 2 X 2 X 3

2. Draw two intersecting circles, each circle contains the prime factors of one of the two numbers.

18 12

3. Place the prime factors for each number in its circle so that the common prime factors of the two numbers are in the common part between the two circles.

18 12
3 | 2, 3 | 2

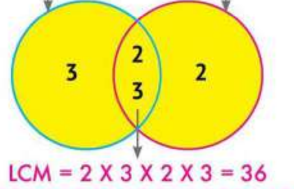
4. **The greatest common factor** of the two numbers is the product of factors presented in the common part between the two circles.

GCF = 2 X 3 = 6

18 12
3 | 2, 3 | 2
GCF = 2 X 3 = 6

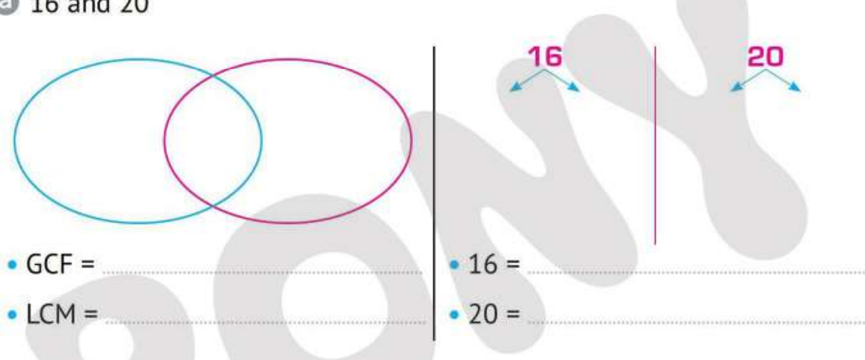
5. The least common multiple of the two numbers is the product of all the factors in the two circles.

LCM = 2 X 3 X 2 X 3 = 36



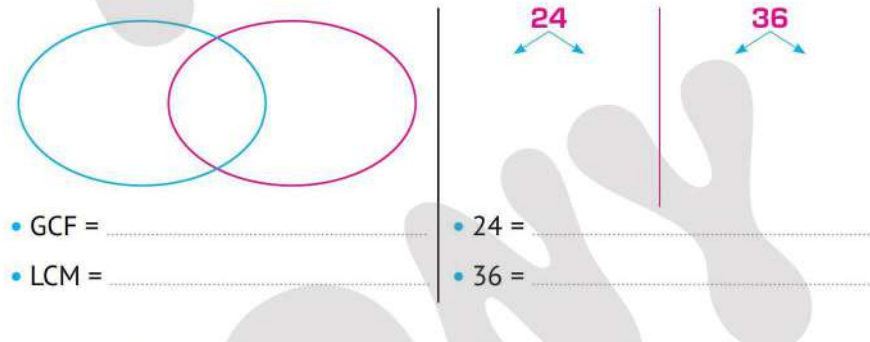
2 **Find the GCF and LCM of the following numbers:**

ⓐ 16 and 20



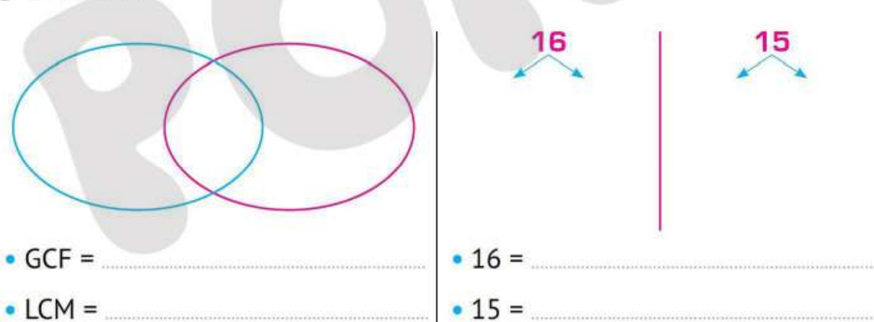
- GCF = ...
- LCM = ...
- 16 = ...
- 20 = ...

ⓑ 24 and 36



- GCF = ...
- LCM = ...
- 24 = ...
- 36 = ...

ⓒ 16 and 15



- GCF = ...
- LCM = ...
- 16 = ...
- 15 = ...

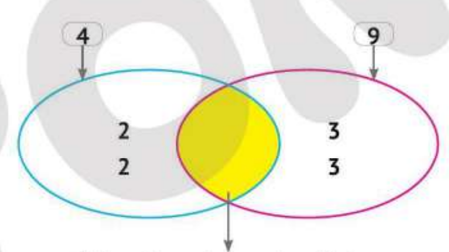
Relatively Prime Numbers

They are numbers whose only common factor is 1.

So, they are prime numbers with respect to each other.

For example: 4 and 9 are composite numbers.

4 = 2 X 2 , 9 = 3 X 3



When there is no prime factors in the common part, then

GCF = 1

- The greatest common factor of 4 and 9 is 1.
- Therefore 4 is a prime number with respect to 9.
- 9 is a prime number with respect to 4.
- 4 and 9 are relatively prime numbers.



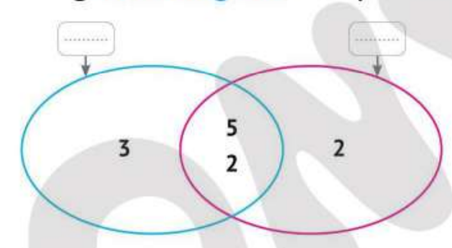
- The lowest common multiple of the relatively prime numbers is **their product**.

For example: The common multiple of 4 and 9 is **4 X 9 = 36**.

3 Complete the following table:

	Numbers	Prime Factors	GCF	LCM	Relatively Prime Numbers (Yes or No?)
Ex.	12 , 15	12 = 2 X 2 X 3 15 = 3 X 5	3	2X2X3X5 = 60	No
a	9 , 8	9 = ... 8 = ...	......	....	....
b	15 , 4	15 = ... 4 = ...	......	....	....
c	6 , 8	6 = ... 8 = ...	......	....	....

4 Using the following Venn diagram, complete:



a The two numbers represented in the Venn diagram are .... and ....

b The common prime factors of the two numbers are ....

c The GCF for the two numbers is ....

d The LCM for the two numbers is ....

e Are the two numbers relatively prime numbers? ....

(Yes or No?)



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1 Complete the following:

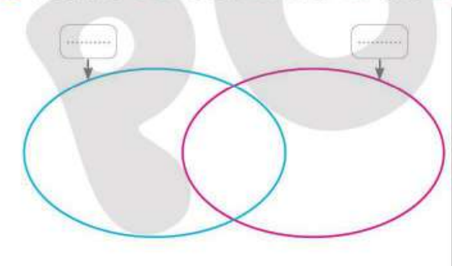
a The prime number has only .... factor(s).

b The LCM of the two relatively prime numbers is ....

c Two numbers are relatively prime numbers if their GCF is ....

2 Answer the following:

a Find the GCF and LCM for 16 and 24 using the following Venn diagram:



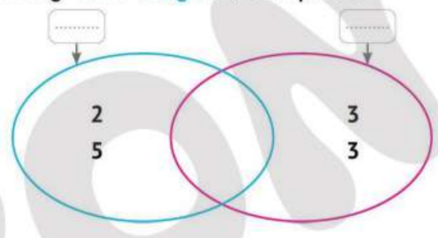
16



24

- GCF = ...
- LCM = ...
- 16 = ...
- 24 = ...

b Using the following Venn diagram, complete:



1. The two numbers represented in the Venn diagram are .... and ....
2. The common prime factors of the two numbers are ....
3. The GCF for the two numbers is ....
4. The LCM for the two numbers is ....
5. Are the two numbers relatively prime number? ....

(Yes or No?)



Writing Expressions Using the GCF

Remember

- The Distributive Property states that multiplying a number by the sum of two addends is the same as multiplying that number by each addend individually and then adding those products.

Ex. 7 X (3 + 9) = (7 X 3) + (7 X 9)

1 Complete the following:

a) 5 X (3 + 6) = (........ X ....) + (........ X ....)

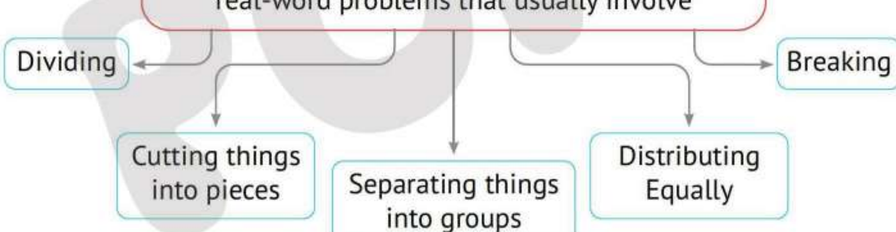
b) .... X (........ + ...) = (7 X 2) + (7 X 4)

c) 8 X (........ + ...) = (........ X 9) + (........ X 2)

d) .... X (4 + 6) = (9 X ....) + (9 X ....)

Writing Numerical Expressions Using the Greatest Common Factor

- The greatest common factor is used to solve real-word problems that usually involve



- Numerical expressions can be written to express real-world problems using the Distributive Property.

Theme 1

Ex. A student collected 12 bags of legumes and 8 boxes of cheese to prepare cartons of donations for the poor. Write a numerical expression that represents the largest number of cartons possible so that all cartons include the same number of the two types of food.

Answer To find the largest number of cartons, the greatest common factor of 12 and 8 must be found.

$12 = 2 \times 2 \times 3$

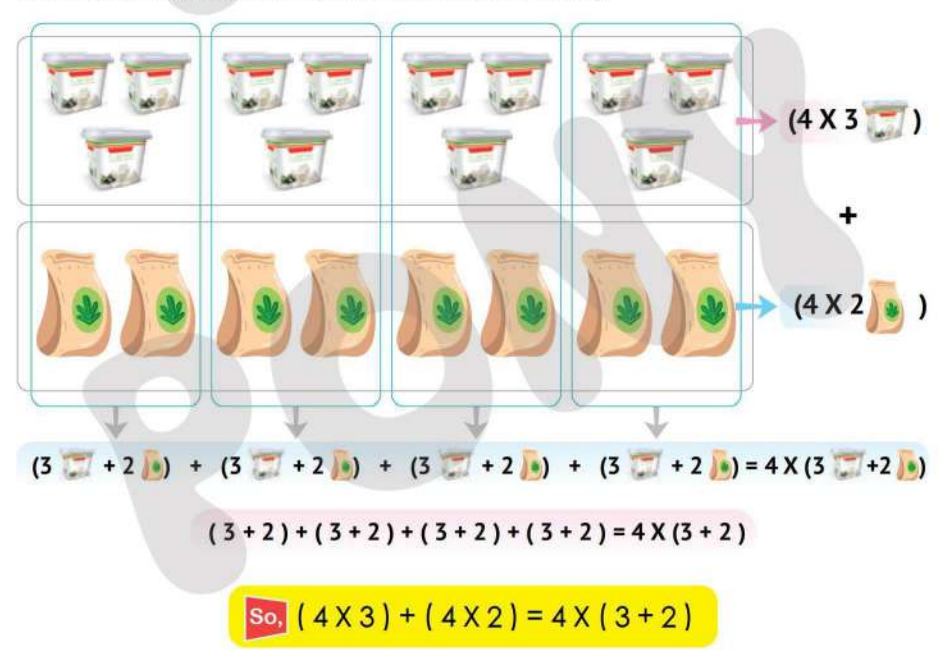
$8 = 2 \times 2 \quad \times 2$

$GCF = 2 \times 2 = 4$

This means that:

- The largest number of cartons is GCF = 4 cartons.
- The number of bags of legumes in each carton is $12 \div 4 = 3$ bags.
- The number of cheese boxes in each carton is $8 \div 4 = 2$ boxes.

The following figure represents the cartons,



(3 + 2) + (3 + 2) + (3 + 2) + (3 + 2) = 4 X (3 +2)

$(3 + 2) + (3 + 2) + (3 + 2) + (3 + 2) = 4 \times (3 + 2)$

So, $(4 \times 3) + (4 \times 2) = 4 \times (3 + 2)$

2 **Malak cooked 30 dishes of Um Ali and 48 pieces of baklava for her family. She wants to divide the desserts into boxes so that each person gets the same number of the two desserts.**
Write a numerical expression representing the largest number of boxes that she can prepare.



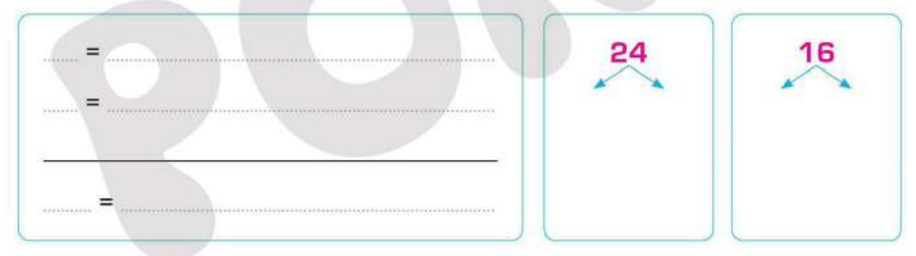
ⓐ The largest number of boxes (GCF) is ....

ⓑ Number of Umm Ali dishes in each box: ....

ⓒ Number of baklava pieces in each box: ....

ⓓ The numerical expression: ....

3 **Ahmed wants to grow 24 jasmine plants and 16 phil plants in his garden. Ahmed wants to plant these plants in basins so that each basin contains the same number of the two types of plants.**
Write a numerical expression that represents the largest number of basins he can plant.



The numerical expression: ....

....



10

1 Complete the following:

a) 5 X (7 + 2) = (5 X ....) + (.................. X 2)

b) 2 X (.................. + ...) = (.................. X 4) + (.................. X 6)

c) The GCF for 9 and 6 is ....

d) The GCF of all numbers is ....

e) 5 x (.................. + ...) = 30 + 40

2 Answer the following:

a) Sama has 12 red pens and 15 blue pens. What is the greatest number of groups can Sama divide the pens into so that all groups contain the same number of both colors?

...... = ...

...... = ...

...... = ...

....

....

....

b) Marwa divided 12 oranges and 8 candies into bags so that the bags contained the same number of oranges and the same number of candies. Write a numerical expression for this situation.

....

....

....



Analyzing Least Common Multiples

Remember

For Adding and Subtracting Fractions with Unlike Denominators By Using the LCM

Solution steps:

1. Find the LCM for the denominators.
2. Replace these fractions with **equivalent fractions** with a like denominator.
3. Add or subtract, then putting the answer in its simplest form if possible.

For example:

ⓐ **Add:** $3\frac{3}{8} + 9\frac{1}{6}$

Note that:

1. The LCM for 8 and 6 is 24.
2. $3\frac{3}{8} = 3\frac{9}{24}$ (×3) , $9\frac{1}{6} = 9\frac{4}{24}$ (×4)
3. $3\frac{3}{8} + 9\frac{1}{6} = 3\frac{9}{24} + 9\frac{4}{24} = 12\frac{13}{24}$

ⓑ **Subtract:** $9\frac{4}{9} - 6\frac{1}{3}$

Note that:

1. The LCM for 9 and 3 is 9.
2. $9\frac{4}{9} = 9\frac{4}{9}$, $6\frac{1}{3} = 6\frac{3}{9}$ (×3)
3. $9\frac{4}{9} - 6\frac{1}{3} = 9\frac{4}{9} - 6\frac{3}{9} = 3\frac{1}{9}$

Theme 1

1 Find the result: (In the simplest form)

a) $\frac{3}{4} + \frac{5}{12}$ = ... + ... = ...

b) $\frac{7}{9} - \frac{1}{3}$ = ... − .... = ...

c) $2\frac{3}{8} + 1\frac{5}{6}$ = ... + ... = ...

d) $5\frac{8}{9} - 3\frac{1}{2}$ = ... − .... = ...

e) $8\frac{1}{5} + 2\frac{1}{3}$ = ... + ... = ...

f) $6\frac{2}{3} - 2\frac{1}{4}$ = ... − .... = ...

Learn

Analyzing the Least Common Multiple

Ex. Ola made 4 trays of basbousa of the same size and cut each tray of basbousa in a different way. After the end of the party, she noticed that there was left over basbousa in each tray, as follows:

$\frac{1}{3}$ of the first tray, $\frac{1}{6}$ of the second tray, $\frac{5}{12}$ of the third tray, $\frac{1}{4}$ of the last tray.

What is the total amount of basbousa left?

$\frac{1}{3} + \frac{1}{6} + \frac{5}{12} + \frac{1}{4} = \frac{4}{12} + \frac{2}{12} + \frac{5}{12} + \frac{3}{12} = \frac{14}{12} = 1\frac{2}{12} = 1\frac{1}{6}$ trays

2 Answer the following:

a) Maher spent $2\frac{3}{4}$ hours studying Arabic, $1\frac{1}{2}$ hours studying mathematics, and $1\frac{1}{5}$ hours studying science.

How many hours did Maher spend studying all subjects?

....

....

ⓑ Galal bought a pen for $5\frac{1}{2}$ pounds, a ruler for $3\frac{3}{4}$ pounds, and an eraser for 2 pounds. How much money did Galal pay to buy these supplies?

....

....

ⓒ Karim had $25\frac{1}{2}$ pounds, and he bought a booklet for $16\frac{1}{4}$ pounds. How much money is left with Karim?

....

....

ⓓ Ahmed runs for $4\frac{1}{2}$ hours a day, and Heba runs for $3\frac{1}{4}$ hours a day. What is the difference between the time they both run?

....

....



$\frac{\quad}{10}$

1 Complete the following:

ⓐ $5\frac{1}{6} + 3\frac{1}{3} =$ ....

ⓑ $9\frac{1}{2} - 2\frac{1}{4} =$ ....

ⓒ $7\frac{3}{4} -$ .... $= 3\frac{2}{5}$

ⓓ .... $- 3\frac{4}{5} = 7\frac{1}{3}$

2 Answer the following:

ⓐ Attia bought $3\frac{1}{2}$ kg of oranges and $4\frac{1}{4}$ kg of bananas. What is the total mass of fruit that Attia bought?

....

....

ⓑ Hana had 12 meters of fabric, of which she used $3\frac{1}{2}$ meters to make a dress. How many meters of fabric does she have left?

....

....



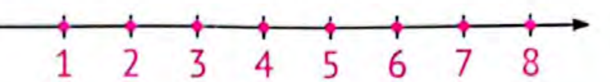
Using a Number Line to Describe Data
Using a Number Line and Symbols to Compare Numbers



Counting Numbers

They are the numbers that we use in the counting process.

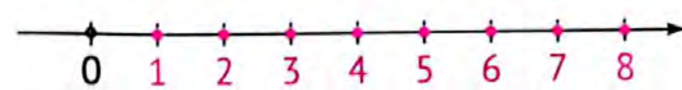
1, 2, 3, 4, 5, 6, ...



Natural Numbers

They are the set of counting numbers in addition to zero.

0, 1, 2, 3, 4, 5, 6, ...



Learn

Integers

They are numbers that do not contain decimal or fractional parts, and they are:

Negative numbers

They are numbers less than zero, preceded by a (–) sign.

Ex. –5, –58, –212, ...

Zero

"0" is neither positive nor negative.

Positive numbers

They are numbers greater than zero and are written without a sign.

Ex. 25, 2, 157, ...

Keywords

Negative

- To the left
- Loss
- Sub zero
- Backward
- Below sea level
- Withdraw
- Down
- Deep

Positive

- To the right
- Profit/Gain
- Over zero
- Foreword
- Above sea level
- Deposit
- Up
- High

Examples of Negative Numbers

Temperatures



- In some European countries in winter, temperatures may reach minus 26 degrees Celsius, and we express this by saying the temperature is "**–26 degrees Celsius**" (minus 26).

Sea level



- Sea level is used as a standard for calculating the land's elevation. It represents the number "**0**" and places that are lower than sea level (less than zero) in negative numbers.

Ex. It is possible to dive in nature for a distance of 10 meters below sea level (–10 meters).

1 Write an integer to represent each of the following situations:

a) The value of the profit is 25 Egyptian pounds. (..........)

b) The value of the loss is 3 pounds. (..........)

c) The temperature is 10 degrees below zero. (..........)

d) The building's height is 12 meters. (..........)

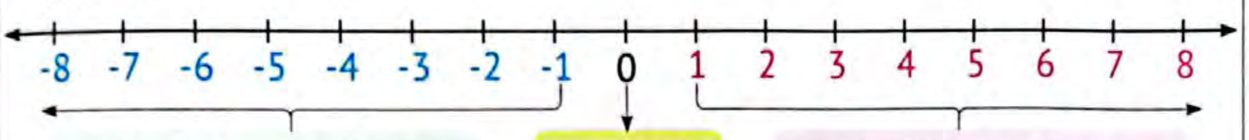
e) The drop is 19 meters underground. (..........)

f) Move 4 steps back. (..........)

Learn

Representing Integers on a Number Line

- Each integer can be represented by only one point on the number line, as follows:



Negative numbers (numbers less than zero) are written to the left of zero.

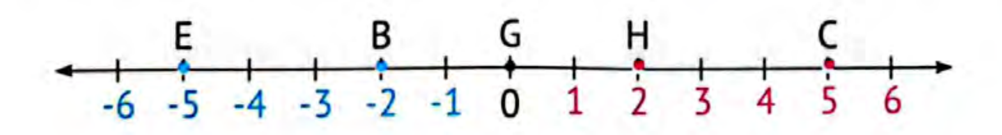
Zero "0"

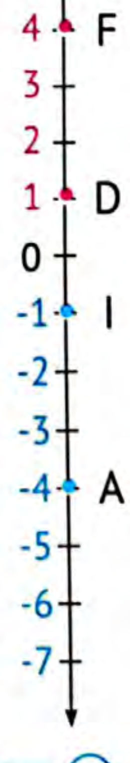
Positive numbers (numbers greater than zero) are written to the right of zero.

- Positive integers are: 1, 2, 3, 4, 5, 6, 7, 8, ...
- Negative integers are: −1, −2, −3, −4, −5, −6, −7, −8, ...

Integers extend without ending to the left and right of zero.

Ex. **Write the numbers indicated by the symbols shown on each of the horizontal and vertical number lines:**



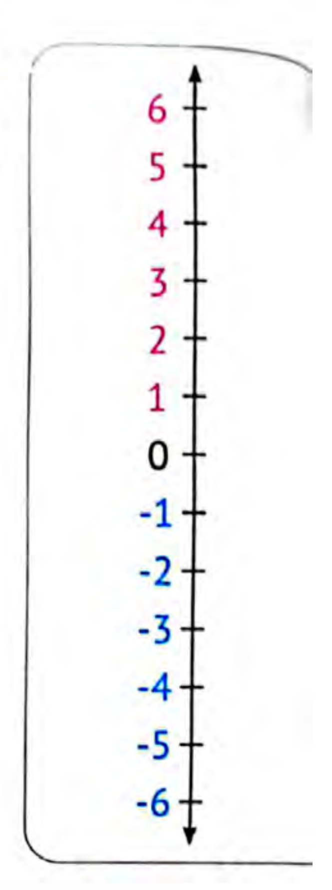


A → −4	D → 1	G → 0
B → −2	E → −5	H → 2
C → 5	F → 4	I → −1



2 The following table shows the temperature at which some liquids freeze. Determine these temperatures on the number line shown.

Liquids	Freezing Point (In Celsius)
a Olive oil	−5
b Fresh water	0
c Sea water	−2
d Peanut oil	3
e Orange juice	−6



Learn

Comparing Integers Using a Number Line

- A number line can be used to compare integers, as follows:

Horizontal Number Line

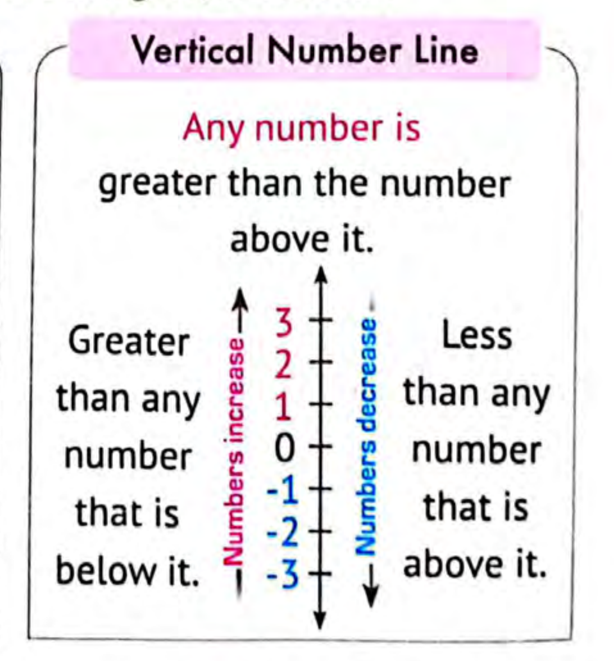
Any number is greater than any number that is to the left of it

Numbers increase →

-3 -2 -1 0 1 2 3

← Numbers decrease

and less than any number that is to the right of it.



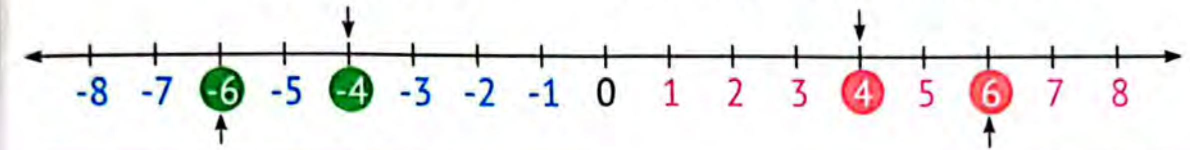
So that ... < −5 < −4 < −3 < −2 < −1 < 0 < 1 < 2 < 3 < 4 < 5 < ...



Using the following number line:

−4 comes just after −5.
−4 is next to −5.

4 comes just before 5.
4 is the previous number of 5.



−6 comes just before −5.
−6 is the previous number of −5.

6 comes just after 5.
6 is next to 5.

3 **Complete the following:**

ⓐ .... comes just after −3.

ⓑ 6 comes just after ....

ⓒ −7 is next to ....

ⓓ .... is next to 7.

ⓔ .... comes just before −9.

ⓕ 0 comes just before ....

ⓖ −2 is the previous number of ....

ⓗ −1 is the previous number of ....



- The numbers **increase** from left to right and from bottom to top.
- The numbers **decrease** from right to left and from top to bottom.
- Any positive number is **greater than** any negative number.
- Zero is **less than** any positive number and **greater than** any negative number.

Negative Integers < 0 < Positive Integers

- The **smallest positive number** is 1, and the **largest positive number** cannot be specified.
- The **largest negative number** is "−1", and the **smallest negative number** cannot be specified.
- Zero is the **smallest** non-negative number and the **largest** non-positive number.

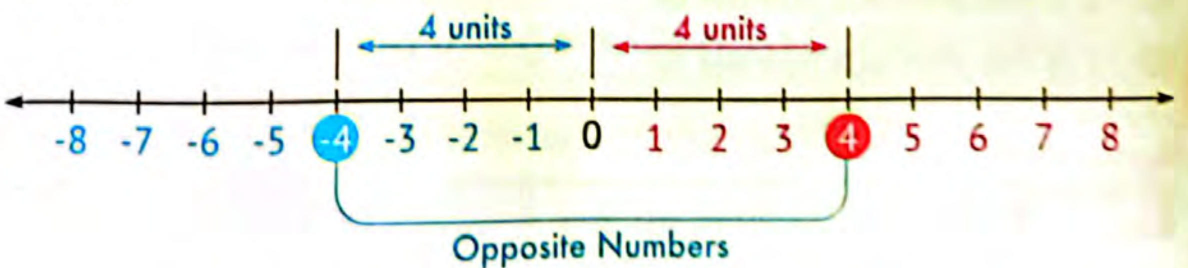
4 **Compare using (<, =, or >):**

a) 8 9
b) -5 ...... -7
c) -6 5
d) 9 ...... -4
e) 3 ...... -3
f) 9 0
g) 0 ...... -10
h) -6 ...... -6
i) 7 7

Learn

Opposite Numbers (Additive Inverse)

- On the number line, any two numbers at the same distance from "0" and at two opposite locations from it are called **opposite numbers** (Additive inverse).



The opposite of 4 is –4, and the opposite of –4 is 4.

So, 4 and –4 are **opposite numbers**.

4 and –4 are the addition inverse of each other.

5 **Write the opposite of each of the following numbers:**

a) -7 → ......
b) 6 → ......
c) -15 → ......
d) 12 → ......
e) 0 → ......
f) -45 → ......



10

1 Complete the following:

a The greatest non-positive integer is ....

b A temperature that is 4 °C below zero is written as "....................."

c The opposite of –3 is ....

2 Choose the correct answer:

a –4 > .... (2 or 0 or –3 or –7)

b The integer that comes just before –3 is ....
(–4 or 4 or –2 or 2)

c –25 ____ 12 (> or = or <)

3 Arrange the following numbers in an ascending order:

3 , –30 , –18 , 0 , 11

.... , ... , ... , ... , ...







Analyzing Rational Numbers by Using Models
Comparing and Ordering Rational Numbers





Rational Numbers

A rational number is the quotient of an integer by another integer that is not equal to zero, and it can be expressed as a fraction or a decimal number.

So, rational numbers are all numbers that can be put in the form $\frac{a}{b}$.

Where "a" is an integer, and "b" is an integer that is not equal to zero.

- All fractions and mixed numbers are rational numbers.

Ex. $\frac{3}{4}$, $\frac{5}{8}$, $3\frac{2}{5} = \frac{17}{5}$, $3\frac{1}{4} = \frac{13}{4}$

- All decimals are rational numbers.

Where they can be put in the form of a normal fraction $\frac{a}{b}$.

Ex. $0.8 = \frac{8}{10}$, $0.23 = \frac{23}{100}$, $2.5 = \frac{25}{10}$, $24.08 = \frac{2,408}{100}$

- All integers are rational numbers.

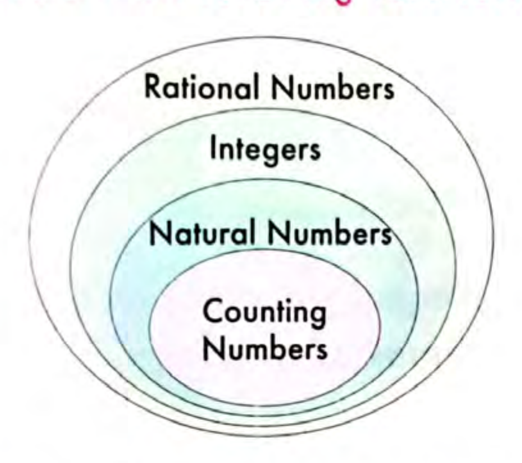
Where they can be put in the form of a normal fraction $\frac{a}{b}$.

Ex. $3 = \frac{3}{1}$, $-5 = -\frac{5}{1}$, $-12 = -\frac{12}{1}$, $213 = \frac{123}{1}$, $0 = \frac{0}{1}$



- Counting numbers are also natural numbers, integers, and rational numbers.
- Natural numbers are also integers and rational numbers.
- Integers are also rational numbers.

We can represent the previous sets of numbers in the following Venn form:



Rational Numbers → Non-integers (Fractions/Decimals), Integer

Integer → Negative Integers, Natural Numbers

Natural Numbers → Zero, Counting Numbers (Positive Integers)

1 **Classify the following numbers according to the number groups shown. Put a tick ✓:**

	Number	Counting Numbers	Natural Numbers	Integers	Rational Numbers
a	5				
b	0				
c	-7				
d	3.5				
e	$\frac{3}{4}$				
f	$-2\frac{1}{3}$				

2 **Write the following rational numbers in fraction form $\frac{a}{b}$:**

a) 0.75: ....

b) −45: ....

c) 4: ....

d) 0: ....

e) $3\frac{1}{5}$: ....

f) −1.5: ....

Learn

Representing Rational Numbers on a Number Line

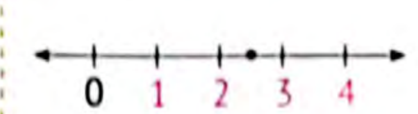
To determine the position of a rational number on a number line, find the two integers between which the fractions or decimals lie.



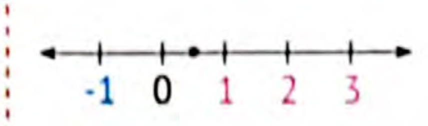
Identify the following numbers on the number line:

$$\left(2.5, \frac{1}{2}, -5.5, 6\frac{3}{4} \right)$$

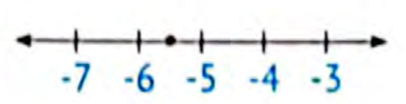
2.5 lies between the two integers 2 and 3.



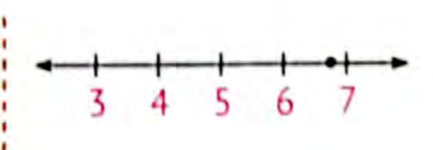
$\frac{1}{2}$ lies between the two integers 0 and 1.



−5.5 lies between the two integers −5 and −6.

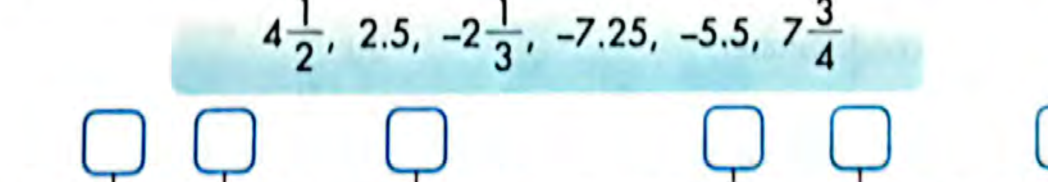


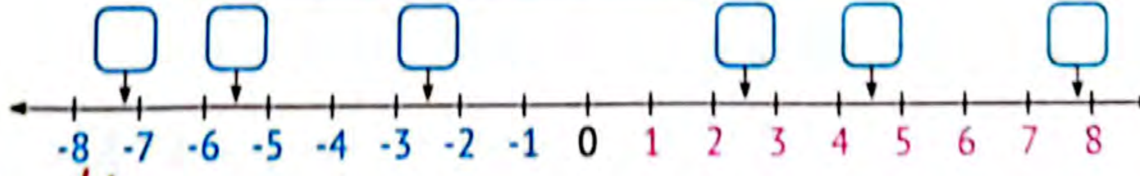
$6\frac{3}{4}$ lies between the two integers 6 and 7.



3 **Put the following numbers in the suitable places on the number line:**

$$4\frac{1}{2},\ 2.5,\ -2\frac{1}{3},\ -7.25,\ -5.5,\ 7\frac{3}{4}$$





Important Notes:

- The additive inverse of 6.3 is −6.3 $\left(-\frac{63}{10}\right)$.
- The additive inverse of $-\frac{5}{8}$ is $\frac{5}{8}$.

Theme 1

4 **Write the opposite number (the additive inverse) of each of the following rational numbers:**

ⓐ -0.8 →

ⓑ $-\frac{3}{4}$ →

ⓒ 2.5 →

ⓓ 0 →

ⓔ 0.6 →

ⓕ $3\frac{1}{7}$ →

Learn

Comparing Two Rational Numbers

1 If the two numbers are different in sign, then the positive number is greater than the negative number.	$0.5 > -\frac{15}{8}$, $-1.5 < \frac{1}{8}$
2 If one of the two numbers is greater than a certain number, and the other number is less than the same number, then the first number is greater than the second number.	$\frac{23}{30} < \frac{13}{10}$ (Because $\frac{23}{30} < 1$ and $\frac{13}{10} > 1$) $-\frac{23}{30} > -\frac{13}{10}$ (Because $-\frac{23}{30} > -1$ and $-\frac{13}{10} < -1$)
3 If the two numbers are in the form $\frac{a}{b}$, and have the same denominator, then the number with the greatest numerator is the greatest.	$\frac{5}{7} < \frac{8}{7}$ (Because $5 < 8$) $-\frac{5}{7} > -\frac{8}{7}$ (Because $-5 > -8$)

4 If the two numbers are in the form $\frac{a}{b}$ and have the same numerator, then the number with the greatest denominator is the smallest.	$\frac{3}{8} > \frac{3}{10}$ (Because $8 < 10$) $-\frac{3}{8} < -\frac{3}{10}$ (Because $-8 > -10$)
5 If the two numbers are in the form $\frac{a}{b}$ and the numerator and denominator are different, unify their denominators, and then compare the two resulting numerators.	$\frac{3}{5} < \frac{2}{3}$ (Because $\frac{3}{5} = \frac{9}{15}$, $\frac{2}{3} = \frac{10}{15}$, $\frac{9}{15} < \frac{10}{15}$) $-\frac{3}{5} < -\frac{2}{3}$ (Because $-\frac{3}{5} = -\frac{9}{15}$, $-\frac{2}{3} = -\frac{10}{15}$, $-\frac{9}{15} > -\frac{10}{15}$)

5 Compare using (<, =, or >):

a) $-\frac{6}{7}$ ☐ $-\frac{3}{7}$

b) $-\frac{13}{10}$ ☐ $\frac{1}{8}$

c) $\frac{5}{12}$ ☐ $\frac{7}{12}$

d) $-\frac{4}{7}$ ☐ $-\frac{1}{2}$

e) $\frac{3}{5}$ ☐ $\frac{2}{3}$

f) $-\frac{2}{3}$ ☐ $-\frac{2}{7}$

g) 0.9 ☐ $\frac{9}{10}$

h) 1.4 ☐ $\frac{14}{100}$

i) $-3\frac{1}{4}$ ☐ 1



- To arrange rational numbers, we follow the same comparison rules.



Ex. **Arrange the following numbers from the smallest to the greatest:**

ⓐ $2.1 , 1.4, -3\frac{1}{4}, -1\frac{7}{8}, -2\frac{1}{2}$

The order: $-3\frac{1}{4} , -2\frac{1}{2} , -1\frac{7}{8} , 1.4 , 2.1$

The numbers are arranged by looking at the integer parts in each number.

ⓑ $-0.3 , 0.7 , -\frac{1}{2} , \frac{3}{4} , \frac{2}{5}$

$-0.3 , 0.7 , -\frac{1}{2} , \frac{3}{4} , \frac{2}{5}$

Put all the numbers in rational number form $\frac{a}{b}$. → $-\frac{3}{10} , \frac{7}{10} , -\frac{1}{2} , \frac{3}{4} , \frac{2}{5}$

Find the common denominators if you need to. → $-\frac{3}{10} , \frac{14}{20} , -\frac{5}{10} , \frac{15}{20} , \frac{8}{20}$

Arrange the negative numbers, and then the positive numbers. → $-\frac{5}{10} , -\frac{3}{10} , \frac{8}{20} , \frac{14}{20} , \frac{15}{20}$

The order: $-\frac{1}{2} , -0.3 , \frac{2}{5} , 0.7 , \frac{3}{4}$

6 **Arrange the following numbers:**

ⓐ $3\frac{5}{9} , 5\frac{3}{8} , 0.6 , -4 , 2\frac{3}{7}$

1 Ascending order: ...., ..., ..., ..., ...

2 Descending order: ...., ..., ..., ..., ...

b 0.3 , -0.2 , $\frac{1}{4}$, $-\frac{1}{4}$, $\frac{1}{2}$

1 Ascending order: ...., ..., ..., ..., ...

2 Descending order: ...., ..., ..., ..., ...



10

1 **Choose the correct answer:**

a "−1.9" is a/an ....

(counting number or natural number or integer or rational number)

b The opposite of $-\frac{8}{9}$ is .... ($\frac{8}{9}$ or $-\frac{9}{8}$ or $\frac{9}{8}$ or $1\frac{1}{8}$)

c $\frac{2}{3}$ ☐ $-\frac{2}{3}$ (> or = or <)

d The rational number −5 lies between the two integers ....

(−4, −5 or −3, −4 or −4, − 6 or 5, 6)

2 **Complete the following:**

a The additive inverse of 5.9 is ....

b .... is a negative integer more than −2.

c All integers are .... numbers.

d The additive inverse of .... is itself.

3 **Arrange the following numbers in a descending order:**

$-3\frac{1}{5}$, $-7\frac{1}{2}$, -3.8 , -7 , 7.7

.........., ..., ..., ..., ...



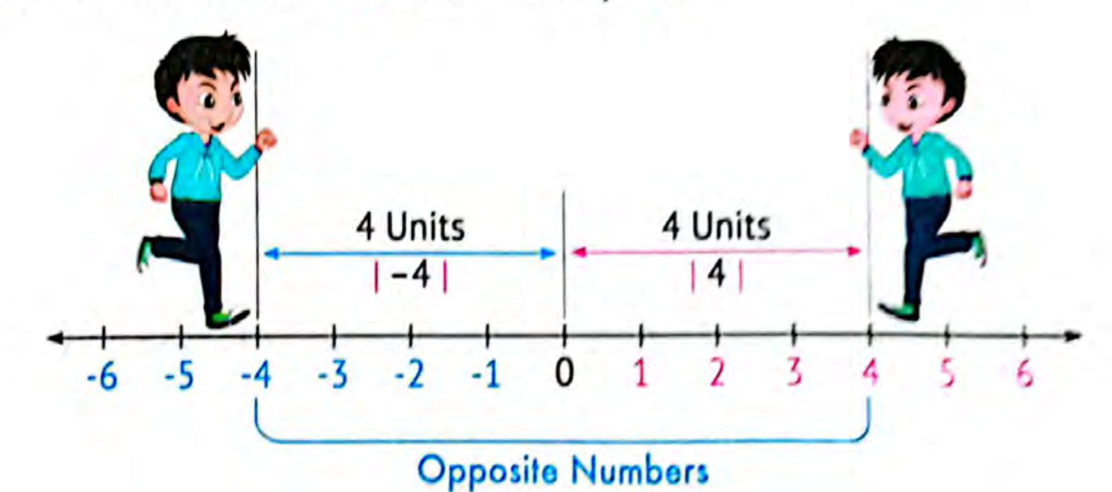
Exploring Absolute Value
Comparing Absolute Values



Learn

Absolute Value

- The absolute value is the **distance** between a number and zero on the number line.
- The absolute value of a number represents the **magnitude** of that number, regardless of the direction (positive or negative).
- The absolute value of "x" is denoted by | x |.



From the previous number line, we notice that:

- The distance between "4" and "0" is 4 units.

  So, the absolute value of 4 is 4. → $|4| = 4$

- The distance between "–4" and "0" is 4 units.

  So, the absolute value of –4 is 4. → $|-4| = 4$



- $|-4| = 4$
- $-|-4| = -4$

1 Find the value of each of the following:

ⓐ $|-10|$ = ⓑ $|4|$ =

ⓒ $\left|-\frac{2}{3}\right|$ = ⓓ $\left|\frac{4}{7}\right|$ =

ⓔ $|2.05|$ = ⓕ $|-12.5|$ =

2 Find the value of "x" in each of the following:

ⓐ If $|9| = x$, then x = ...

ⓑ If $|-15| = x$, then x = ...

ⓒ If $-|1.2| = x$, then x = ...

ⓓ If $|-2| + |-9| = x$, then x = ...

ⓔ If $|x| = 6$, then x = ... or x = ...



- The absolute value of any number is a **positive number**, except zero.
- The absolute value of zero is **zero**. $|0| = 0$
- Opposite numbers on a number line have the **same** absolute values.
- The highest possible absolute value is the **farthest** from zero.
- The **smaller** possible absolute value is the closer to **zero**.

Learn

Comparing Absolute Values

Ex. Compare using (<, =, or >):

ⓐ $|-3|$ ...... $|3|$
$3 = 3$

ⓑ $-|5|$ .... $|-5|$
$-5 < 5$

ⓒ $-|-4|$ .... $|-7|$
$-4 < 7$





3 Compare using (<, =, or >):

ⓐ -1.4 ⬜ $|-1.4|$

ⓑ $|-4|$ ⬜ $-|-4|$

ⓒ $|-2.71|$ ⬜ 2.7

ⓓ $|-8.2|$ ⬜ -7.9

ⓔ $-|9\frac{3}{5}|$ ⬜ $|-9\frac{3}{4}|$

ⓕ $5\frac{5}{6}$ ⬜ $|-\frac{35}{6}|$

4 Arrange the following numbers in an ascending order:

2.5 , -3.4 , $|-5.3|$, -4 , $|0.8|$

.............., ..., ..., ..., ...

5 Answer the following:

ⓐ It is $-5°C$ in freezer (A) and $-22°C$ in freezer (B). Which freezer has the lower temperature?

....

....

ⓑ Lake (A) has an elevation of -16 meters, and lake (B) has an elevation of -6 m. Which lake is located farther below sea level?

....

....

ⓒ Which is the greater rational number? -4.88 or -4.8?

....

....



Creating Mathematical Expressions
Analyzing Mathematical Expressions

Theme 1

Learn

Variable

- It's a symbol, usually a letter, representing an unknown quantity that may vary or change.

Ex. x, y, z, ...

Constant

- It is a number or a letter that represents a single number.

Ex. 5, -1.2, 127, $\frac{5}{9}$

Algebraic Term

It may be:

1. A fixed number only, such as: 9, 0.5, $\frac{1}{6}$, ...
It is called an absolute term.
2. A variable only, such as: x, y, z, ...
3. The product of multiplying numbers and variables.

Numerical Factor / Coefficient → $4n$ ← Algebraic Factor / Variable

Numerical Factor / Coefficient → $-\frac{5}{6}xy$ ← Algebraic Factor / Variable



- If an algebraic term consists of one algebraic factor, the coefficient is "1" or "-1".



- In the algebraic term "x", the coefficient is "1".
- In the algebraic term "-y", the coefficient is "-1".



Theme 1

Lessons 1&2 Creating Mathematical Expressions / Analyzing Mathematical Expressions

Learn

Variable

- It's a symbol, usually a letter, representing an unknown quantity that may vary or change.

Ex. x, y, z, ...

Constant

- It is a number or a letter that represents a single number.

Ex. 5, -1.2, 127, $\frac{5}{9}$

Algebraic Term

It may be:

1. A fixed number only, such as: 9, 0.5, $\frac{1}{6}$, ...
   It is called an absolute term.
2. A variable only, such as: x, y, z, ...
3. The product of multiplying numbers and variables.

$4n$: Numerical Factor (Coefficient) → 4; Algebraic Factor (Variable) → n

$-\frac{5}{6}xy$: Numerical Factor (Coefficient) → $-\frac{5}{6}$; Algebraic Factor (Variable) → xy



- If an algebraic term consists of one algebraic factor, the coefficient is "1" or "-1".



- In the algebraic term "x", the coefficient is "1".
- In the algebraic term "-y", the coefficient is "-1".

1 **Complete the following table:**

	Algebraic Term	Number of Factors	Coefficient	Algebraic Factors
Ex.	$9xy$	3	9	x, y
a	$3m$	....	....	....
b	$-5y$	....	....	....
c	$\frac{1}{3}ab$	....	....	....
d	$-\frac{3}{7}n$	....	....	....
e	$6xyz$	....	....	....

Mathematical Expressions

Numerical Expression — Algebraic Expression

Numerical Expression

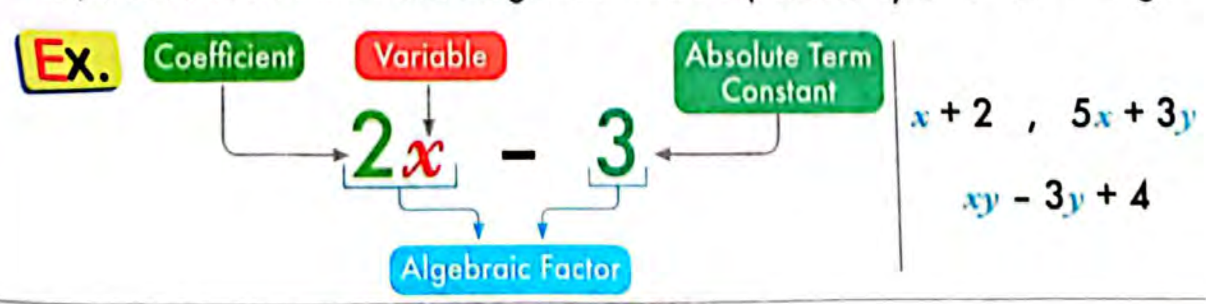
- It is a mathematical statement that contains a group of numbers and one operation at least.

Ex. 15 + 23 – 0.36

Algebraic Expression

- It is a mathematical statement that may contain a group of numbers, variables, operation symbols, or any of them.
- Or, it consists of one or more algebraic terms separated by a "+" or "–" sign.

Ex.



Theme 1

2 Classify the following mathematical expressions into numerical expressions or algebraic expressions: Put a tick (✓):

	Mathematical Expression	Numerical Expression	Algebraic Expression
a	$3 + 0.2 - 1.25$	....	....
b	$5x - 3$	....	....
c	9×2.7	....	....
d	$2a + 3c - 5$	....	....
e	$9x$	....	....

Learn

Equation is a mathematical sentence that has two expressions separated by an equal sign. One or both of the expressions contains one unknown (or more).

Ex. $3y - 5 = 2x + 6$, $5 + x = 9$

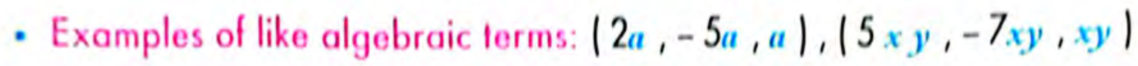
3 Complete the following table:

	Mathematical Expression	Variables	Absolute Term (Constant)	Coefficients
Ex.	$3a + 6b + 7$	a, b	7	3, 6
a	$-8xy + \frac{1}{3} + 20$	x, y	$\frac{1}{3}$, 20	− 8
b	$2a + 7 + 4a$	....	....	....
c	$17 + 5 + x$	....	....	....
d	$22 + \frac{1}{5} + 2y$	....	....	....
e	$0.2q + 0.6r + 0.8s$	....	....	....
f	8	....	....	....

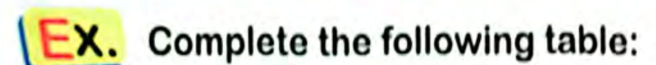
Unit 3

Like and Unlike Terms

Algebraic terms are like if the algebraic symbols that make up their factors are similar.



- Examples of like algebraic terms: ($2a$, $-5a$, a) , ($5xy$, $-7xy$, xy)



- Examples of unlike algebraic terms: ($6y$, $-8ab$, $9x$)

Ex. Complete the following table:

	Expression	Number of Terms	Like Terms
a	5	1	None
b	8 + 2	2	2, 8
c	$5b + 6 + 2b$	3	$5b$, $2b$
d	$3x + 7$	2	None

4 Complete the following table:

	Expression	Number of Terms	Like Terms
a	$x + \frac{3}{8}x + 3$		
b	$m + 3 + 2m + 2$		
c	$16x + 2x$		
d	$7x + 7x + 1 + 2x$		

Writing a mathematical expression:

Ex. If an astronaut is approximately 0.05 meters taller while traveling in space than he is on Earth, write a mathematical expression that represents the astronaut's height on Earth if his height in space is h meters.

Answer: Mathematical expression: $h - 0.05$

Theme

5 **Write a mathematical expression that represents each of the following situations:**

ⓐ The mass of the astronaut on the moon is $\frac{1}{6}$ his mass of the Earth. If the mass of an astronaut on Earth is m kg, then his mass on the moon is: .

ⓑ If Ahmed sleeps for 7 hours a day, then the number of hours he sleeps in n days is: .



10

1 **Choose the correct answer:**

ⓐ In the algebraic term " $-5xy$ ", the coefficient is .
(y or x or 5 or –5)

ⓑ Like terms for the algebraic expression "3 + 5a + 2a" are .
(3, 5a or 5a, 2a or 3, 2a or 3, 5a, 2a)

ⓒ The number of terms of the algebraic expression $2.5x + 2xy - 4$ is .
(3 or 4 or 5 or 6)

2 **Complete the following:**

ⓐ Two numbers whose product is 9, one of which is x, so the other number is: ( )

ⓑ 7 X (2.7 + 1.3) is a/an .

ⓒ The coefficient in the algebraic term: 5ab is .

3 **Match:**

ⓐ In (3x + 7), 7 is a . • • coefficient 1

ⓑ In (3x + 7), 3 is a . • • variable 2

ⓒ In (3x + 7), x is a . • • constant 3



Writing Algebraic Expressions



Learn

Converting Algebraic Expressions into Verbal Expressions

- The algebraic expression can be written in words. This is called a or a verbal expression.
- There are words or phrases that can be used to suggest the operation in a mathematical problem, such as:

Addition	Subtraction	Multiplication	Division
			
Plus, Added to, More than, Together, And, The total, Sum, Exceed, Increase	Minus, Subtracted from, Less than, How much is the increase/ decrease, Difference, Subtract, Take away	Times, Multiplied by, Times of, Each, Double, Twice, Product, Multiplication, Triple, Thrice	Divided by, For each, Ratio, Half/quarter..., Quotient, Division, Distribution

Important Notes:

If we have the number x, then:

- x plus 8 is $x + 8$.
- The sum of x and 2 is $x + 2$.
- x minus 3 is $x - 3$.
- 7 minus x is $7 - x$.
- Twice x is $2x$.
- 3 times x is $3x$.
- 4 times x is $4x$.
- 5 times x is $5x$.
- Half of x is $\frac{1}{2}x = \frac{x}{2}$.
- Third of x is $\frac{1}{3}x = \frac{x}{3}$.

Theme 1

1 Express each of the following using algebraic expressions:

a) 5 more than x: (............)
b) 3 less than y: (............)
c) 4 multiplied by a: (............)
d) Twice n: (............)
e) Half of m: (............)
f) 5 divided by t: (............)

Ex.

The following algebraic expression can be expressed using the verbal form in more than one way:

$x + 2$

- The sum of x and 2
- x plus 2
- x increased by 2
- 2 more than x
- 2 greater than x
- 2 added to x

2 Write each of the following algebraic expressions using the word form. Name two different verbal expressions for each of them:

a) $x + 7$
1 ....
2 ....

b) $x - 3$
1 ....
2 ....

c) $8x$
1 ....
2 ....

d) $\frac{x}{3}$
1 ....
2 ....



- An algebraic expression can have **more than one** operation.
- Parentheses are used to express the **result** of addition or subtraction.

Ex. **The following algebraic expressions have two operations:**

$2x + 5$ Sum of the double of x and 5	$2(x + 5)$ Double of the sum of x and 5
$7x - 3$ The difference between 7 times x and 3	$7(x - 3)$ 7 times the difference between x and 3

Notice the change in the verbal expression when using the parentheses.

3 **Express each of the following verbal forms using algebraic expressions:**

a) 6 is more than three times m: (..............................)

b) 3 is less than 3 multiplied by a: (..............................)

c) The sum of half of y and 7: (..............................)

d) Twice the sum of b and 6: (..............................)

e) The sum of twice b and 6: (..............................)

4 **Write each of these algebraic expressions using the verbal form:**

a) $3x + 2$: ....

b) $4y - 6$: ....

c) $\frac{1}{3}x - 4$: ....

d) $6(a + 7)$: ....

e) $3(s - 2)$: ....

5 **Choose the algebraic expression that represents each of the following:**

a) Twelve is less than three groups of y.

($12 - 3y$ or $3y - 12$ or $3(y - 12)$ or $3(12 - y)$)

b) Mohamed bought 4 boxes, each containing "c" of cookies.

($c + 4$ or $c - 4$ or $4c$ or $4 \div c$)

Unit 2

c Aunt Farah has collected the same number of eggs for two weeks, and in the third week, she cooked half of the eggs she collected previously. How many eggs does she have left?

[$2 \div 14e$ or $(2 \div 14)e$ or $14e \div 2$ or $2e \div 14e$]

d Hazem's car needs one liter of petrol to travel a distance of 15 km. How many liters does the car need for d km?

($15d$ or $15 + d$ or $\frac{15}{d}$ or $\frac{d}{15}$)



$\frac{}{10}$

1 Write each of these algebraic expressions using the verbal form:

a $x - 2$: ....

b $5a + 7$: ....

c $3.6 - 2y$: ....

2 Choose the correct answer:

a Kareem is "y" years old now, how old was he 3 years ago? ....

($y - 3$ or $y + 3$ or $3 \div y$ or $3y$)

b Twice the sum of 7 and x is ....

($2x + 7$ or $2(x + 7)$ or $27 + x$ or $2(2x + 7)$)

c The expression of: double the number minus 4 is: (+, – or x, – or x, + or x, ÷)

3 Match each verbal expression to the appropriate algebraic expression:

a The sum of y and 3 is .... • • $2y + 3$ 1

b The sum of twice of y and 3 is .... • • $3y$ 2

c The product of y and 3 is .... • • $2(y + 3)$ 3

d Twice the sum of y and 3 is .... • • $y + 3$ 4



Order of Operations and Exponents

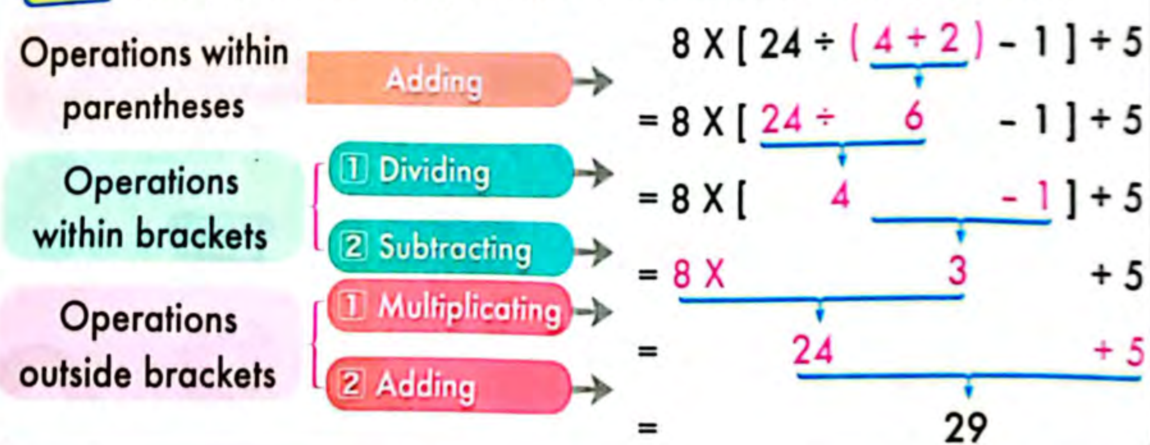
Remember

Steps of the Order of Operations

1. Perform operations within parentheses ( ). → 2. Perform operations within brackets [ ]. → 3. Perform operations outside of parentheses or brackets.

For each step:
1. Multiply or divide from left to right.
2. Add or subtract from left to right.

Ex. Use the order of operations to evaluate the expression:



1 Use the order of operations to evaluate the expressions:

ⓐ 4 X 6 + 18 ÷ 3

....

....

ⓑ (5 + 8) X (16 – 9)

....

....

ⓒ [1.5 X (12 + 8)] – 15

....

....

ⓓ 28 ÷ [4 X (4 – 0.5)]

....

....



Learn

Repeated Multiplication

Repeated multiplication is the repeated multiplication of a number by itself a number of times.

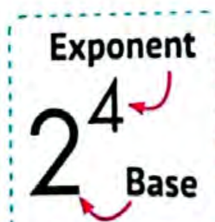
Ex. **$2 \times 2 \times 2 \times 2$ (It is a repeated multiplication of 2 by itself 4 times.)**

Repeated multiplication $2 \times 2 \times 2 \times 2$ can be written as 2^4.

And it's read as: 2 to the power of 4 **Or** 2 to the fourth power

- We note that:

- 2 is the repeated number and is called the "base".
- 4 is the number of repetitions and is called the "exponent, power, or index".



Ex. $4 \times 4 \times 4 = 4^3$, **and it's read as:** 4 to the power of 3.



- Any number to the power of 1 = itself.

Ex. $3^1 = 3$ "3 to the power of 1 or the first power of 3"

The power of 1 is not written.

- $3 \times 3 = 3^2$ "3 to the power of 2, or the second power of or the square of 3."
- $4 \times 4 \times 4 = 4^3$ "4 to the power of 3, or the third power of 4 or the cube of 4."
- $2^5 \neq 2 \times 5$ "Because: $2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$,

$2 \times 5 = 10$"

- Any number to the zero power equals 1. (Except zero)

Ex. $3^0 = 1$, $6^0 = 1$, $(-4)^0 = 1$

- 1 to the power of any number = 1.

Ex. $1^9 = 1$, $1^5 = 1$, $1^5 = 1$

- 0 to the power of any number = 0. (Except zero)

Ex. $0^6 = 0$, $0^2 = 0$, $0^{23} = 0$

Theme 1

2 Complete the following:

a) $9 \times 9 \times 9 = 9^{\dots}$

b) $7 \times 7 \times 7 \times 7 \times 7 \times 7 = \dots^{6}$

c) ...... X ...... X ...... X ...... $= 7^4$

d) $3^2 = \dots$

e) $2^3 = \dots$

f) $5^0 = \dots$

g) $0^3 = \dots$

h) $1^7 = \dots$

i) $8^{\dots} = 1$

j) $\dots^{5} = 1$

k) $\dots^{4} = 0$

Learn — Order of Operations and Exponents

When the expression contains exponents, the value of the exponents is calculated before multiplication and division.

1 Perform operations within parentheses ( ).	2 Perform operations within brackets [ ].	3 Perform operations outside of parentheses or brackets.
1 Exponents 2 Multiply or divide from left to right. 3 Add or subtract from left to right.	1 Exponents 2 Multiply or divide from left to right. 3 Add or subtract from left to right.	1 Exponents 2 Multiply or divide from left to right. 3 Add or subtract from left to right.

Ex. Use the order of operations to evaluate the expression:

a) $(15 - 9) + 3 \times 4^2 \div 2$

$= 6 + 3 \times 4^2 \div 2$

$= 6 + 3 \times 16 \div 2$

$= 6 + 48 \div 2$

$= 6 + 24$

$= 30$

b) $6^2 \div (17 - 8) \times (3 + 4)$

$= 6^2 \div 9 \times 7$

$= 36 \div 9 \times 7$

$= 4 \times 7$

$= 28$

3 Use the order of operations to evaluate the expressions:

a) $2 \times 5 + 3^2$

b) $64 \div 2^4 \times 5$

c) $20 \times (5 + 4) - 5^2 \times 4$

d) $10^2 \times [3 \times (2.35 - 1.12)]$



10

1 Find the value of:

a) $3^3 =$ ....

b) $48 \div 8 \times 2 =$ ....

c) $8 \times (12 \div 4) =$ ....

d) $8 + 5^2 - 30 =$ ....

e) $(2^5 + 3) \div (2^3 - 1) =$ ....

2 Choose the correct answer:

a) $4^3 =$ .... ($4 + 3$ or 4×3 or $4 + 4 + 4$ or $4 \times 4 \times 4$)

b) $(10 \times 3 - 8) - 5 \times (6 - 2)$ (8 or 0 or 2 or 68)

c) 3^2 ☐ 2^3 (< or = or > or ≤)

d) $2^3 + 2^3 =$ .... (4^3 or 3^4 or 2^4 or 4^6)

e) $7^{\dots} = 7$ (0 or 1 or 2 or 10)





Evaluating Algebraic Expressions
Applications on Algebraic Expressions
Determining Equivalent Algebraic Expressions



Write an Algebraic Expression

Ex. If the price of a small bottle of water is 3 pounds, then the price of:

2 bottles: 3 X 2
3 bottles: 3 X 3
4 bottles: 3 X 4
5 bottles: 3 X 5

Constant (3) — Variable (2, 3, 4, 5)



From the above, we notice that:

- The price of a bottle is constant, while the number of bottles changes.
- If we denote the number of bottles by "x", then the algebraic amount that represents the purchase price of "x" bottles is 3x.



If the price of one shirt is 100 pounds and you have a coupon for 40 LE off your entire purchase, then the price of:

1 shirt: 100 X 1 - 40
2 shirts: 100 X 2 - 40
3 shirts: 100 X 3 - 40
4 shirts: 100 X 4 - 40

Constant (100) — Variable (1, 2, 3, 4) — Constant (40)



From the above, we notice that:

- The price of a shirt is constant, while the number of shirts changes.
- If we denote the number of shirts by "y", then the algebraic amount that represents the purchase price of "y" shirts is 100y – 40.

Unit 2

1 **Write the algebraic expression that represents each of the following situations:**

a. If the price of one book is 25 pounds, what is the price of "a" books?

b. If a meal costs 65 pounds, what is the price of "b" meals of the same type?

c. Medhat bought "x" kilograms of chocolate and put them in a box that costs 5 pounds. If the price of one kilogram is 34 pounds, what is the amount paid by Medhat?

d. Mona saved 22 pounds from which she bought 3 notebooks, the price of each y pounds. How much money is left with Mona?

Evaluating the Algebraic Expression

You can find the value of an algebraic expression by replacing the variable used with a numerical value, and then follow the order of operations to find the numerical value of that expression.

Ex.

Use the order of operations to evaluate the expression:

a. $6 \div (8x - 3)$ [If $x = 0.5$]

$= 6 \div (8 \times 0.5 - 3)$

$= 6 \div (4 - 3)$

$= 6 \div 1$

$= 6$

b. $9 + (p^2 - 3) \div 2$ [If $p = 5$]

$= 9 + (5^2 - 3) \div 2$

$= 9 + (25 - 3) \div 2$

$= 9 + 22 \div 2$

$= 9 + 11 = 20$

2 **Use the order of operations to evaluate the expressions:**

a) $5m + 2$ [For $m = 0.4$]
=
=
=

b) $9y - 2^3$ [For $y = 2$]
=
=
=

c) $28 \div (n + 2) + 7$ [For $n = 5$]
=
=
=

d) $12 \div (a^2 - 10)$ [For $a = 4$]
=
=
=

e) $b^3 \times 3 \div 6$ [For $b = 2$]
=
=
=

f) $6^2 \div 3 \times (a - 2)$ [For $a = 4$]
=
=
=

3 **A worker in a factory receives a daily wage of 100 pounds for working for a specified number of hours, in addition to an amount of 30 pounds for every additional hour of work.**

a) Write an algebraic expression that expresses the wage that the worker receives on a day on which he worked for y of overtime hours.

b) If the number of overtime hours is 3 hours, what is the amount that he gets for that day?



Equivalent Algebraic Expressions

Algebraic expressions are equivalent if they represent the same value for every value of the variable(s).

Ex. Evaluate each of the following expressions using two different positive integers of your choice. If the expressions are equal, answer yes. If they are not equal, answer no.

a	x + 2x	2(x + 2)	Equal or Not?
If x = 1	1 + 2 X 1 = 1 + 2 = 3	2 X (1 + 2) = 2 X 3 = 6	No
If x = 2	2 + 2 X 2 = 2 + 4 = 6	2 X (2 + 2) = 2 X 4 = 8	No

From the previous table, we find that:

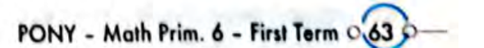
- The two algebraic expressions "x + 2x" and "2(x + 2)" are not always equal, **so** they are not equivalent.

---

b	6x + 3	3(2x + 1)	Equal or Not?
If x = 3	6 X 3 + 3 = 18 + 3 = 21	3 X (2 X 3 + 1) = 3 X (6 + 1) = 3 X 7 = 21	Yes
If x = 4	6 X 4 + 3 = 24 + 3 = 27	3 X (2 X 4 + 1) = 3 X (8 + 1) = 3 X 9 = 27	Yes

From the previous table, we find that:

- The two algebraic expressions "6x + 3" and "3(2x + 1)" are always equal, **so** they are equivalent.



c	3x − 2	3 − (x + 1)	Equal or Not?
If x = 1	3 X 1 − 2 = 3 − 2 = 1	3 − (1 + 1) = 3 − 2 = 1	Yes
If x = 2	3 X 2 − 2 = 6 − 2 = 4	3 − (2 + 1) = 3 − 3 = 0	No

From the previous table, we find that:

- The two algebraic expressions "3x − 2" and "3 − (x + 1)" are not always equal, so they are not equivalent.

4 **Evaluate each of the following expressions using two different positive integers of your choice. If the expressions are equal, answer yes. If they are not equal, answer no.**

a	3x + 6	x + 3 + 2 (x + 1)	Equal or Not?
If x = ...			
If x = ...			

From the previous table, we find that:

- The two algebraic expressions are ....

(equivalent or not equivalent)

ⓑ	4x + 6	3(x + 2)	Equal or Not?
If x = ...			
If x = ...			

From the previous table, we find that:

- The two algebraic expressions are ....

(equivalent or not equivalent)

ⓒ	2x + 2	2(x + 1)	Equal or Not?
If x = ...			
If x = ...			

From the previous table, we find that:

- The two algebraic expressions are ....

(equivalent or not equivalent)





Quiz 10

1 Complete the following:

a) If the price of one pen is 9 pounds, what is the price of k pens?

....

b) Lojy saves z pounds per day. Then, she saves .... pounds in a week.

c) The value of the expression $2x$ (when x = 7) is ....

d) "$2x + 3x + 10$" and "$4(x + 3)$" are equal when x = ...

2 Match:

a) The value of $b^3 - 4b \div 2$ [when $b = 2$] is •	• 7	1
b) The value of $x^2 + x^3 - 10$ [If $x = 2$] is •	• 4	2
c) The value of $(y^2 - 1) \div 5$ [If $y = 6$] is •	• 2	3

3 Choose the correct answer:

a) $3a + 7 = 25$ when a = ... (5 or 6 or 7 or 8)

b) $c^3 + 1 = 9$ when c = ... (1 or 5 or 8 or 2)

c) $4y - 10 = 14$ when y = ... (6 or 5 or 8 or 2)



Solving Algebraic Equations

Theme 1



The Concept of Equation

The following figure shows a scale with two pans.

A pan holds a bag of oranges and 4 kg.



A pan holds 6 kg.

- If we denote the mass of the bag of oranges as "x" kilograms.

So, the total mass on the left side is (x + 4) kilograms.

- The mass of the two pans is equal when

$x + 4 = 6$ or when $x = 2$.

- This means that the mass of the two pans is equal when the mass of the orange bag is 2 kg.

Important Notes:

- $x + 4 = 6$,s is called an equation.
- The letter "x" is called "unknown" or "variable".
- The number "2" is called the solution to the equation (The value of x).

- **The equation:** Is a mathematical sentence that includes an equal relationship between two mathematical expressions.
- The equation has two sides with an (=) sign between them.
- Solving equation: means finding the value of the (unknown) variable.

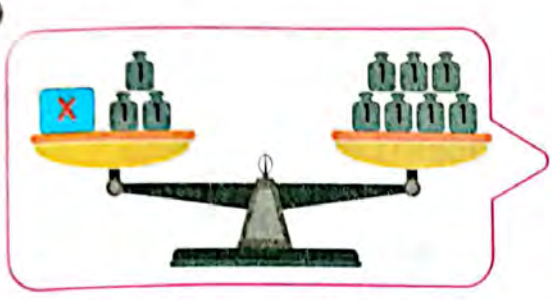
Examples the equations:

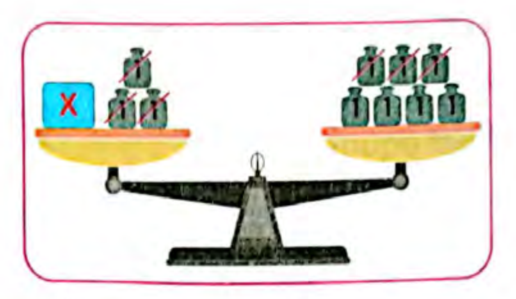
$x + 3 = 8$, $x - 6 = 2$, $3x = 12$, $\frac{x}{3} = 5$



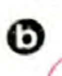
Write the equation that represents each of the following, then find the value of "x":

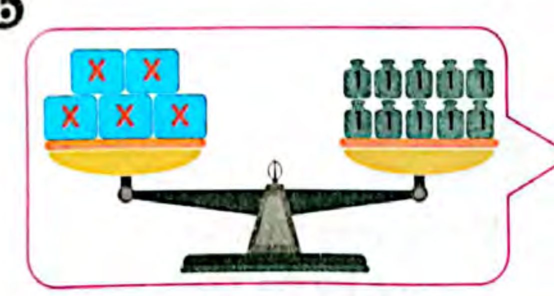


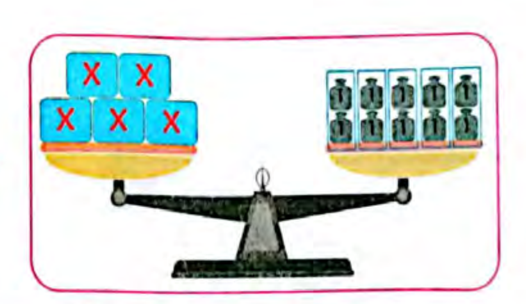




Equation: $x + 3 = 7$ → $x = 4$







Equation: $5x = 10$ → $x = 2$

1 **Write the equation that represents each of the following models, then find the value of "x":**

a



Equation: ....

x: ....





Equation: ....

x: ....





Equation: ....

x: ....





Equation: ....

x: ....

Learn

Solve Equations

- **Adding** equal amounts to both sides of the equation doesn't affect equality.


$b - 3 = 4$

By adding 3 to both sides of the equation

$b - \cancel{3} + \cancel{3} = 4 + 3$

$b = 7$

- **Subtracting** equal amounts from both sides of the equation doesn't affect equality.

Ex. $a + 5 = 9$

By subtracting 5 from both sides of the equation

$a + \cancel{5} - \cancel{5} = 9 - 5$

$a = 4$

- **Dividing** both sides of the equation by the same number (number not equal to zero) doesn't affect equality.


$5\,m = 15$

By dividing both sides of the equation by 5

$\frac{\cancel{5}\,m}{\cancel{5}} = \frac{15}{5}$

$m = 3$

- **Multiplying** both sides of the equation by the same number (number not equal to zero) doesn't affect equality.


$\frac{1}{3}\,n = 2$

By multiply both sides of the equation by 3

$\frac{1}{\cancel{3}}\,n \times \cancel{3} = 2 \times 3$

$n = 6$

2 **Find the value of the variable in each of the following equations (solve the equation):**

ⓐ $x + 7 = 15$

= ....

= ....

ⓑ $a - 6 = 5$

= ....

= ....

c) $9 + y = 6$

= ....

= ....

d) $6m = 18$

= ....

= ....

e) $\frac{n}{5} = 3$

= ....

= ....

f) $\frac{1}{4}t = 2$

= ....

= ....



10

1 Find the value of the variable in each of the following equations (solve the equation)

a) $X + 2 = 11$

= ....

= ....

b) $m - 7 = 9$

= ....

= ....

c) $5y = 45$

= ....

= ....

d) $\frac{k}{8} = 6$

= ....

= ....

2 Choose the correct answer:

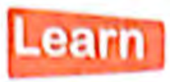
a) If $m + 7 = 25$, then m = ... (7 or 10 or 18 or 20)

b) If $k = 10$, then $k -$ .... $= 4$. (10 or 4 or 2 or 6)

c) If $3f = 27$, then f = ... (8 or 9 or 7 or 4)



Exploring Inequalities
Solving Inequalities



Theme 1

Inequality

Is a mathematical relationship that compares the value of two mathematical expressions by using the signs of the inequality.

Signs of the inequality

is read as:

Sign	Read as
$>$	Greater than
$<$	Less than
$\geq$	Greater than or equal to
$\leq$	Less than or equal to

Remember

When standing any number on the number line, then:

All numbers to the left of this number are less than it

All numbers to the right of this number are greater than it

a

Ex.

ⓐ $x > 2$

Read as: x is greater than 2.

Represents:
- all values greater than 2.
- all numbers to the right of 2 on the number line.

ⓑ $y \geq -3$

Read as: y is greater than or equal to −3.

Represents:
- −3 and all values greater than − 3.
- −3 and all values to the right of − 3 on the number line.

Unit 4

c $m < -1$

Read as: m is less than − 1.

Represents:
- all values less than − 1.
- all values to the left of − 1 on the number line.

---

d $a \leq 0$

Read as: a is less than or equal to 0.

Represents:
- 0 and all values less than 0.
- 0 and all values to the left of 0 on the number line.

1 **Write the inequality that represents each of the following expressions:**

a) All values greater than 4: ....

b) All values less than −3: ....

c) All values greater than or equal to −1. ....

d) All values less than or equal to 5: ....

e) All values to the right of 7 on the number line are:

....

f) All values to the left of −1 on the number line plus −1: ....

2 **Write what each of the following inequalities represents:**

a) $x > -5$: All values ....

b) $x < 1$: All values ....

c) $x \leqslant -2$: All values ....

d) $x \geqslant 4$: All values ....

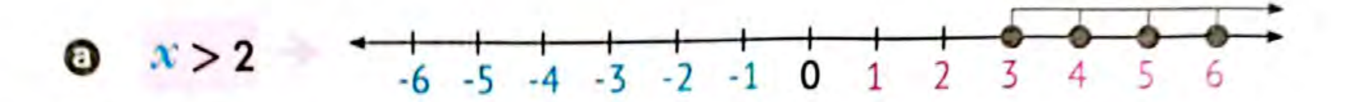
Representing Inequalities on a Number Line

The solution of the inequality is to find the values of the variable (unknown) that make the inequality relation true.

First: When "x" is an integer:

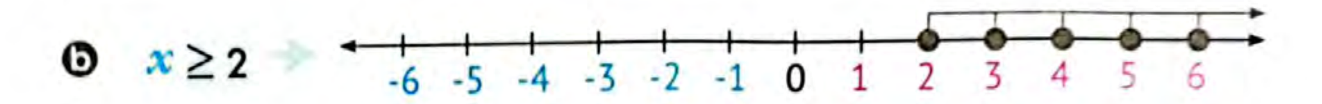
- All integers are represented only by dots at these numbers and connect them with a line that extends without limit.

ⓐ $x > 2$



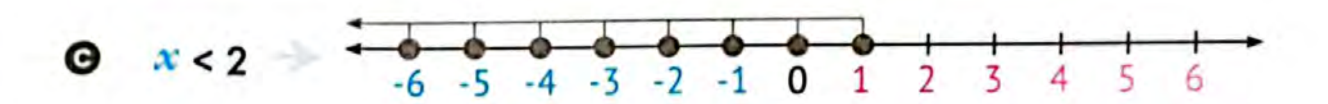
- The set of values that satisfy the inequality is 3 , 4 , 5 , 6 , 7 , 8 ...

ⓑ $x \geq 2$



- The set of values that satisfy the inequality is 2 , 3 , 4 , 5 , 6 , 7 , 8 ...

ⓒ $x < 2$



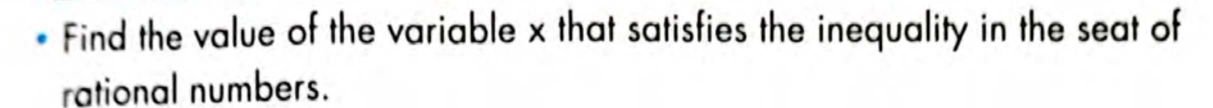
- The set of values that satisfy the inequality is 1 , 0 , -1 , -2 , -3 , -4 , -5 ...

ⓓ $x \leq 2$

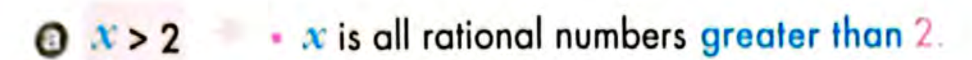
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

- The set of values that satisfy the inequality is 2 , 1 , 0 , -1 , -2 , -3 , -4 , -5...

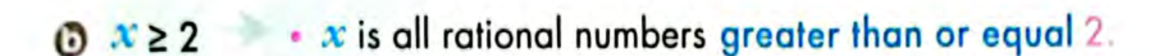
Second: When "x" is a rational number:



- Find the value of the variable x that satisfies the inequality in the seat of rational numbers.



ⓐ $x > 2$ → • x is all rational numbers greater than 2.



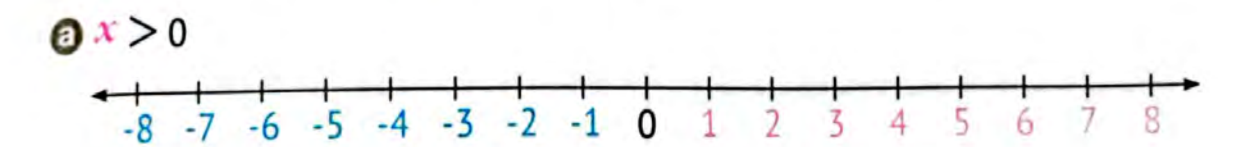
ⓑ $x \geq 2$ → • x is all rational numbers greater than or equal 2.

ⓒ $x < 2$ → • x is all rational numbers less than 2.

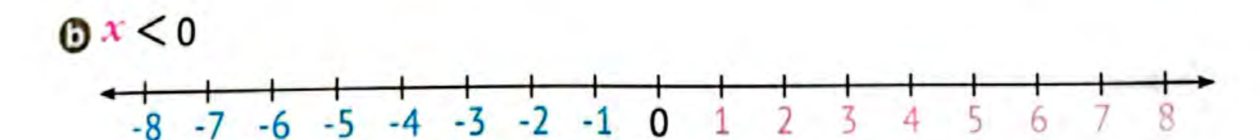
ⓓ $x \leq 2$ → • x is all rational numbers less than or equal 2.

3 Represent each of the following inequalities using the number line shown: (where x is an integer)

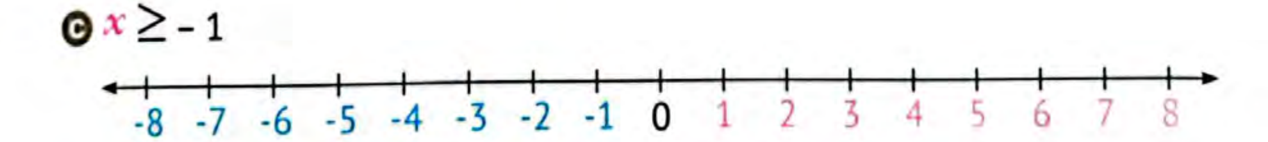
ⓐ $x > 0$



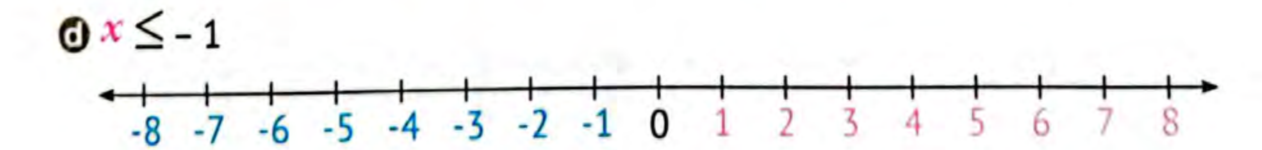
ⓑ $x < 0$



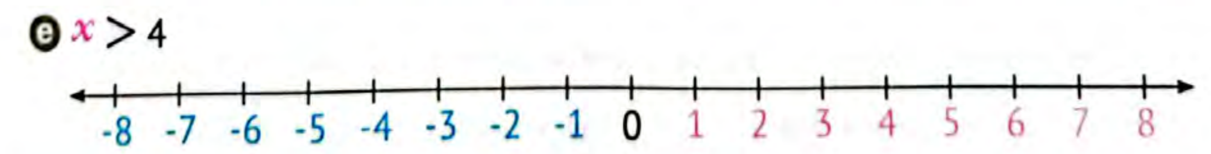
ⓒ $x \geq -1$



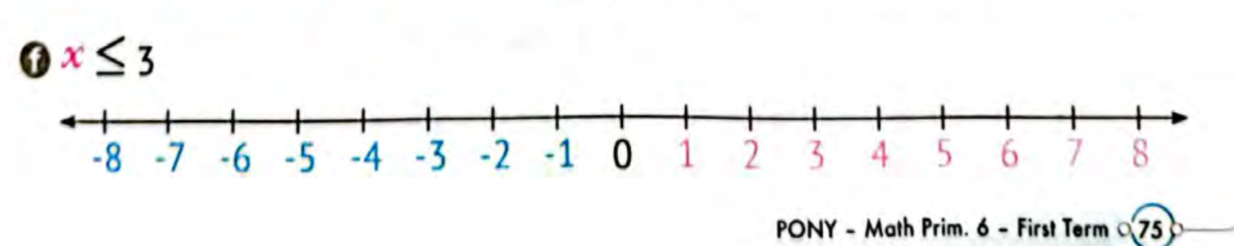
ⓓ $x \leq -1$



ⓔ $x > 4$



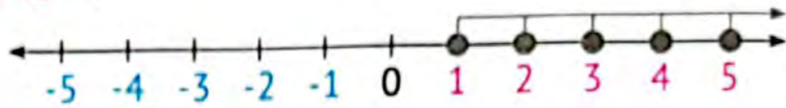
ⓕ $x \leq 3$



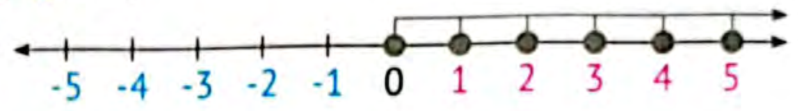


- The numbers previously studied in the first unit can be represented: (where x is an integer)

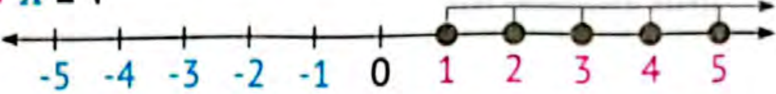
Counting numbers $x \geq 1$ or $x > 0$



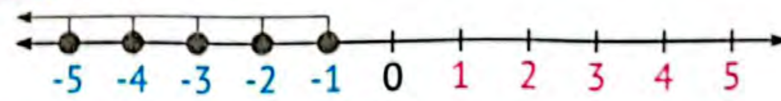
Natural numbers $x \geq 0$ or $x > -1$



Positive integers $x > 0$ or $x \geq 1$

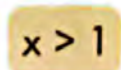


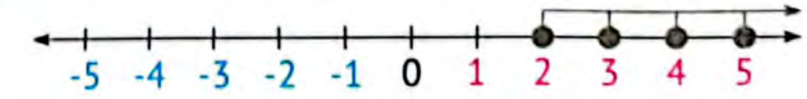
Negative integers $x < 0$ or $x \leq -1$



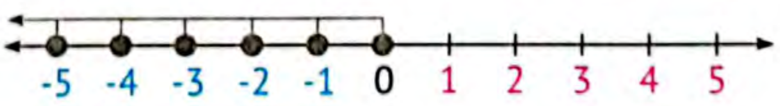


- **The representation of the inequalities $x > 1$, and $x < 1$ on the number line (where x is an integer)**



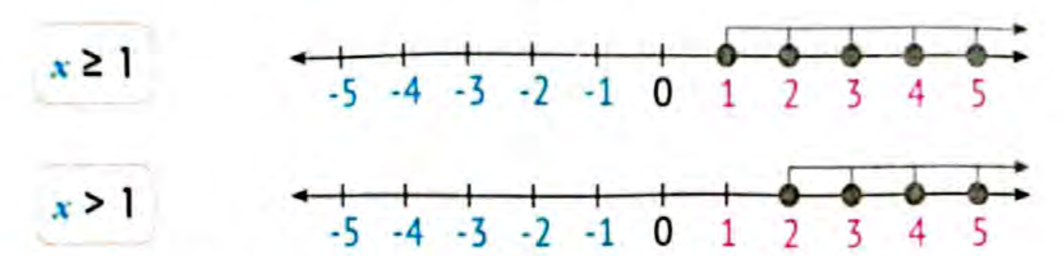


x < 1



- **The two inequalities are similar in:**
  - The number 1 does not belong to the solution set in each of them.
- **The two inequalities differ in:**
  - Each of them represents the values in two opposite directions from the number 1.
  - They have no common points.

- The representation of the inequalities "$x \geq 1$", and "$x > 1$" on the number line of the inequalities (where x is an integer number).





- **The two inequalities are similar in:**
  - Each of them represents the values to the right of the number 1.
  - There are many common points between them.

- **The two inequalities differ in:**
  - The number 1 does not belong to the solution set in the inequality "$x > 1$".
  - The number 1 belongs to the solution set in the inequality "$x \geq 1$".

4 **Choose all the correct sentences about the representation of the inequalities ("$x > -2$" and "$x < -2$") on the number line:**

a) -2 belongs to the solution set in each of them. (   )

b) -2 belongs to the solution set in one of them. (   )

c) The inequality "$x > -2$" includes all values to the left of -2 on the number line. (   )

d) The inequality "$x > -2$" includes all values to the right of -2 on the number line. (   )

e) They have no points in common. (   )

5 **Record each true statement about the graphs of ("$x > -2$" and "$x \geq -2$") on the number line.**

a) -2 belongs to the solution set in each of them. (   )

b –2 belongs to the solution set in one of them. ( )

c The inequality "$x \geq -2$" includes all values to the left of –2 on the number line. ( )

d The inequality "$x > -2$" includes all values to the right of –2 on the number line. ( )

e They have no points in common. ( )



10

1 Write in a verbal method:

a $x > -5$ ....

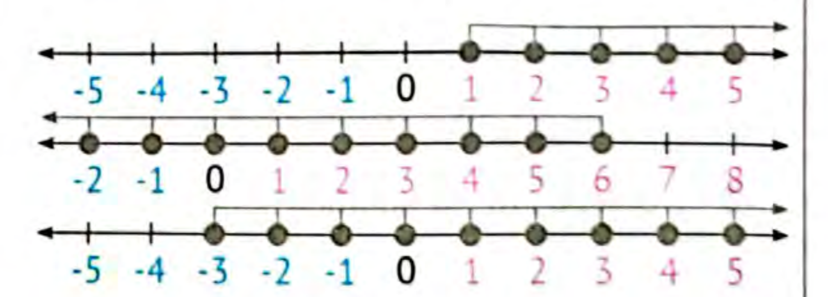
b $x \leq 2$ ....

2 Write the inequality representing the number line:

a 

b 

c 



3 Choose the correct answer:

a The inequality representing the statement "All values greater than" 2 is ....

($x > 2$ or $x < 2$ or $x \leq 2$ or $x \geq 2$)

b The inequality that represents the statement "All values to the right of –1 on a number line" is ....

($x > -1$ or $x < -1$ or $x \leq -1$ or $x \geq -1$)

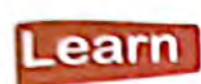
c Which of the following values is a solution to the inequality "$x > -1$"?

(1 or –3 or –2 or –5)



The Relationship Between Dependent and Independent Variables & Applications on Dependent and Independent Variables





Dependent and Independent Variables

Variable

Independent Variable

- It's a variable whose value is not determined or restricted by any other value or variable.
- Therefore any value can be assigned to it.

Dependent Variable

- It's an outcome variable that is determined by or based on the independent variable as the input.

Ex. If the price of one pen is 5 pounds, then the price of:

2 pens:	5	X	2	=	10	pounds
3 pens:	5	X	3	=	15	pounds
4 pens:	5	X	4	=	20	pounds
5 pens:	5	X	5	=	25	pounds

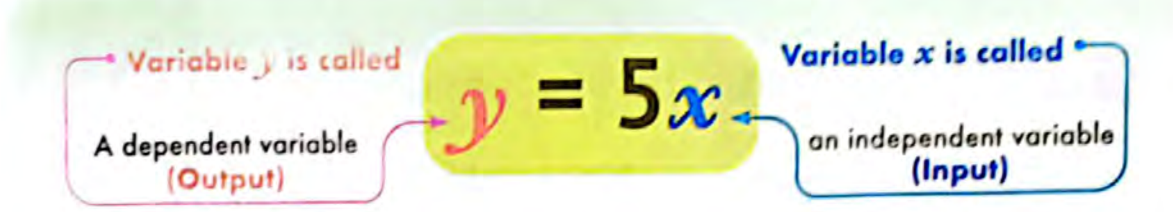
Constant — Independent Variable — Dependent Variable



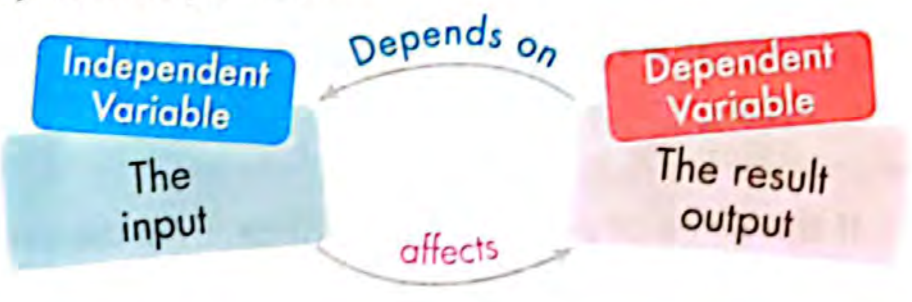
- The price of the pen is **constant**.
- The number of purchased pens is a variable **(an independent variable)**.
- The total purchase price of pens is a variable **(a dependent variable)**.
- The total purchase price of pens depends on the number of pens purchased. As the number of pens changes, the total price of pens also changes.



- If we denote the number of pens by the symbol x, and the total purchase price by the symbol y, the equation that represents the relationship between the number of pens and the total purchase price is:



- The independent variable is usually denoted by " x " and the dependent variable is denoted by " y ".
- Other symbols may be used:



1 **Determine the independent and dependent variables in each of the following situations:**

a **The number of study hours and the exam result:**

- Independent variable: ....
- Dependent variable: ....

b **The job and level of education:**

- Independent variable: ....
- Dependent variable: ....

c **The distance traveled by a car and fuel consumption:**

- Independent variable: ....
- Dependent variable: ....



d **The amount paid and the number of chocolate bars:**

- Independent variable: ....
- Dependent variable: ....

2 **Determine the independent variable and the dependent variable in each of the following relationships:**

Relationship	$X + 3 = y$	$m - 2 = z$	$s \times 7 = a$	$f = \frac{t}{7}$
Independent Variable	....	....	....	....
Dependent Variable	....	....	....	....

Ex. **The price of one kilogram of bananas is 9 pounds, and the price of x kilograms of bananas is y pounds.**

a The equation that represents the relationship between the weight of bananas "x" and the purchase price "y" is $y = 9x$.

b The independent variable is "x".

c The dependent variable is "y".

d The price of 5 kilograms of bananas is $9 \times 5 = 45$ pounds.

3 **Sameh is 6 years younger than his brother Ahmed. If Sameh is x years old and Ahmed is y years old:**

a The equation that represents the relationship between their ages is:

....

b The independent variable is ....

c The dependent variable is ....

d If Sameh is now 12 years old, the age of Ahmed is:

....

4 **In the amusement park, tickets are purchased to be used in each of the games. The following table shows the number of tickets required for each one-time game. Complete the table. Write an equation that**



represents the relationship between the number of game rides "x" and the number of tickets you will need for each game "y". Calculate the number of tickets required to ride each game 8 times.

Game	Ferris Wheel	Swing	Roller Coaster	Rotary Cars
Number of Tickets	3 Tickets	4 Tickets	6 Tickets	8 Tickets
One Time				
Number of Tickets Required to Ride the Game 8 times				



10

1 Complete the following:

a) In the equation $y = 12x$, the independent variable is ...., and the dependent variable is ....

b) If the value of the electricity bill depends on the amount of electricity consumption, then:
The independent variable is ....
The dependent variable is ....

c) If the independent variable is the number of times the player hits the target and the dependent variable is the number of points the player gets, then .... depends on ....

2 Esraa saves 100 pounds every month. Complete:

a) The equation that represents the relationship between the number of months "x" and the total money she saved "y" is ....

b) The independent variable is ....

c) The dependent variable is ....

d) The money she saved in 6 months is ....



Analyzing the Relationship Between Dependent and Independent Variables



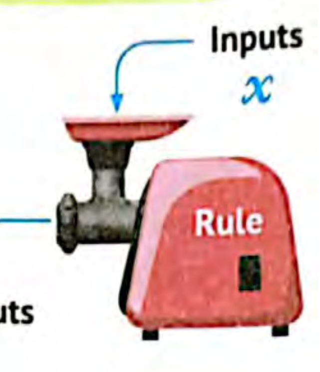
Learn Rules, Variables and Equations - Inputs/Outputs

Relationship: It is the rule that connects the elements of one group with the elements of another group.

Inputs are the values that we use in the relationship and any values can be assigned to them.

Outputs are the values that we get from the relationship.

Input/output tables are a way to represent patterns in tables (charts).



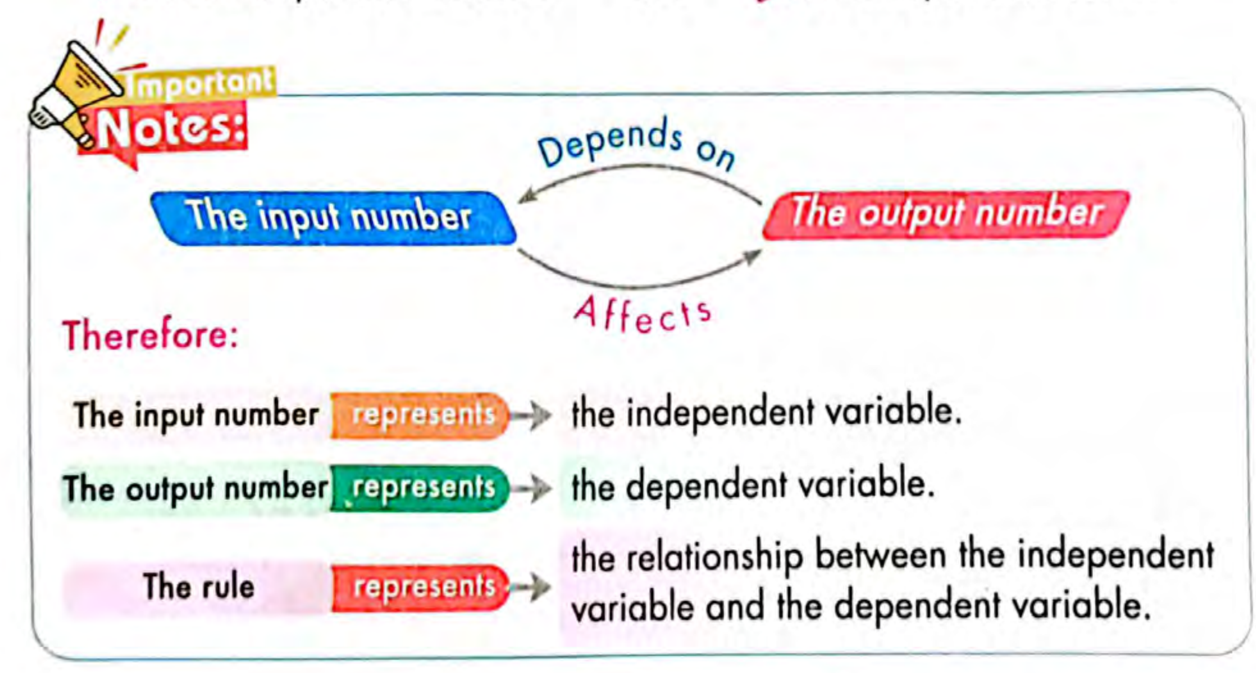


 represents the input number.

 represents the output number.

To write an equation expressing the relationship between the input and the output.

x is the independent variable and y is the dependent variable.





Ex.

Relation		Equation (Rule)
Multiply by 3.	→	$y = 3x$
Add 5.	→	$y = x + 5$
Divide by 8.	→	$y = x \div 8$
Subtract 7.	→	$y = x - 7$
Multiply by 5, then subtract 2.	→	$y = 5x - 2$
Add 3, then divide by 7.	→	$y = (x + 3) \div 7$



- When adding or subtracting before division or multiplication, parentheses are placed.

1 **Use the variables x and y, where x is an independent variable. Write the rule and equation for each of the following:**

	Relation	Equation
a	....	$y = 8x$
b	Add 9	....
c	Divide by 3	....
d	....	$y = 3x + 7$
e	....	$y = (x - 3) \div 2$



Finding Relations and Equations



You can't always know the correct rule for a pattern with one input and one output. You may need more than one input and output.

Ex. **Notice the following patterns:**

ⓐ

Inputs (x)	1	3	5	7
Outputs (y)	4	6	8	10

- **The relation is:** Add 3.
- **The equation is:** $y = x + 3$

Where: – variable (x) represents the input number (independent variable).
– variable (y) represents the output number (dependent variable).

ⓑ

Inputs (x)	8	16	24	32
Outputs (y)	2	4	6	8

- **The relation is:** Divide by 4.
- **The equation is:** $y = x \div 4$

Where: – variable (x) represents the input number (independent variable).
– variable (y) represents the output number (dependent variable).

2 **Notice each table, identify the rule, then complete the pattern:**

ⓐ

Inputs (x)	4	6	8	10	
Outputs (y)	6	8	10		14

Relation: ....
Equation: $y =$ ....

ⓑ

Inputs (x)	1	3	4		9
Outputs (y)	6	8	9	10	

Relation: ....
Equation: $y =$ ....

ⓒ

Inputs (x)	6	9		15	18
Outputs (y)	2	3	4		6

Relation: ....
Equation: $y =$ ....

ⓓ

Inputs (x)	2	3	4	5	
Outputs (y)	8	12	16		24

Relation: ....
Equation: $y =$ ....

Learn A pattern rule can consist of more than one operation.

Ex. Notice the following patterns:

a

x	3	5	7	8
y	10	16	22	25

The relation is: Multiply by 3, then add 1.

The equation is: $y = 3x + 1$

b

x	5	9	13	21
y	2	4	6	10

The relation is: Subtract 1, then divide by 2.

The equation is: $y =$ ~~$2 \div (1 - x)$~~

$y = (x - 1) \div 2$

3 Notice each table and determine the rule. Write an equation to express the relationship between the variables x and y, then complete the pattern in each of the following tables:

a

x	2	4	8	10	5
y	4	10	22	28	....

Relation ....

Equation $y =$ ....

b

x	9	6	12	15	....
y	2	1	3	4	5

Relation ....

Equation $y =$ ....

c

x	4	3	2	6	....
y	10	8	6	14	12

Relation ....

Equation $y =$ ....

d

x	7	13	9	3	5
y	3	6	4	1	....

Relation ....

Equation $y =$ ....

4 Complete the following statements using the variables x and y:

a If the relation is "multiply by 2", then the equation is ....

If $x = 2.3$, then y is equal to ....

b If the relation is "add 6", then the equation is ....

If $x = \frac{1}{5}$, then y is equal to ....

c) If the relation is "multiply by 3, then add 4",

the equation is ....

If $x = 5$, then y is equal to ....



/ 10

1 Complete the following:

a) If the relation is "add 8", then the equation is ....

b) The equation that expresses the relationship "subtract from 3.2" is

....

c) If the equation is $y = 5(x + 2)$, and $x = 5$, then y is equal to ....

2 Choose the correct answer:

a) The equation that expresses the relationship "multiply by 4" is ....

($y = 3x$ or $y = 4 + x$ or $y = 4x$ or $y = x$)

b) The equation that expresses the relationship "multiply by 2, then add 5" is

.... ($y = 5x + 2$ or $y = 2(x + 5)$ or $y = 5(x + 2)$ or $y = 2x + 5$)

c) If $y = 2x + 3$, and $x = 2$, then $y =$ .... (10 or 7 or 13 or 17)

3 Notice the following table, identify the rule, and then complete the pattern:

Inputs (x)	1	2	3	4	....
Outputs (y)	10	15	20	....	30

Relation	....
Equation	$y =$ ....





Graph Representation for Dependent and Independent Variables



Representing the Dependent and Independent Variables

To represent the independent and dependent variables on a coordinate plane as a graph:

- Put the **independent** (input) variable on the **x-axis** (horizontally).
- Put the **dependent** (output) variable on the **y-axis** (vertically).

Unit rate ▷ It is the number of units in one quantity that corresponds to one unit in a second quantity.

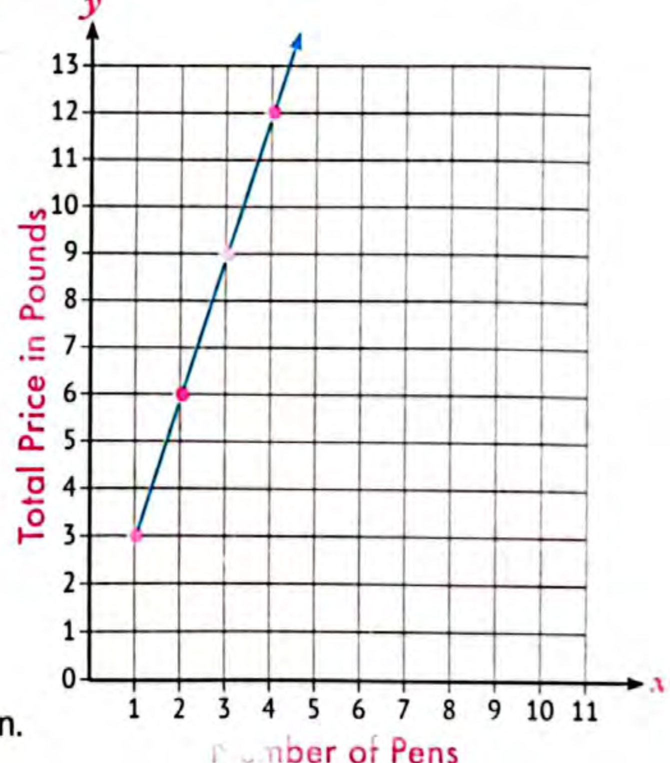


The following table represents the number of pens and their total price:

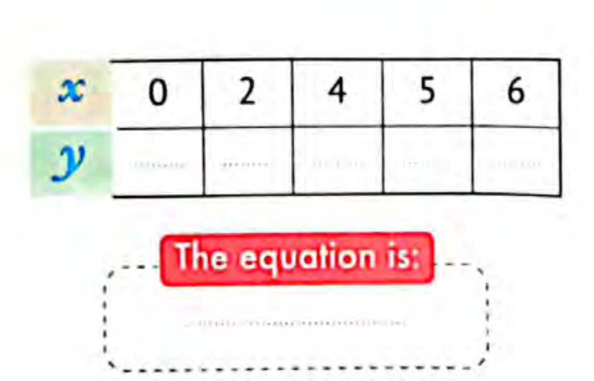
Number of Pens (x)	1	2	3	4
Total Price in Pounds (y)	3	6	9	12

Important Notes:

- The equation that represents the relationship between the variables x and y is $y = 3x$.
- The number of pens (**independent** variable) is represented on the x-axis (**horizontally**).
- The total price of pens (**dependent** variable) is represented on the y-axis (**vertically**).
- The **unit rate** is **3** pounds per pen.

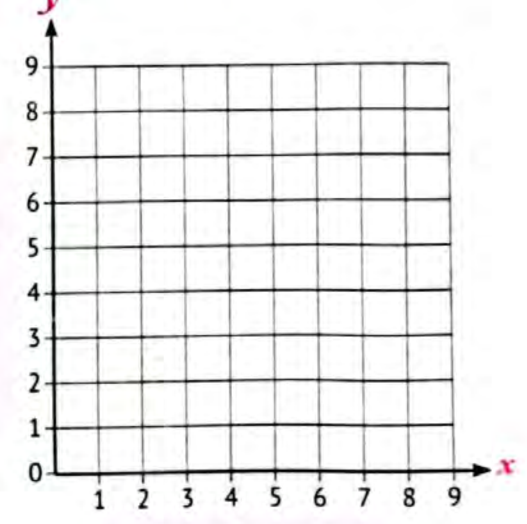


1 You went on three fewer rides than your friend because she got to the amusement park earlier than you. Complete the following table, where x represents the number of your rides and y represents the number of your friend's rides at different times during your amusement park visit. Write an equation to represent the relationship in the table you made. Then, represent that relationship graphically.

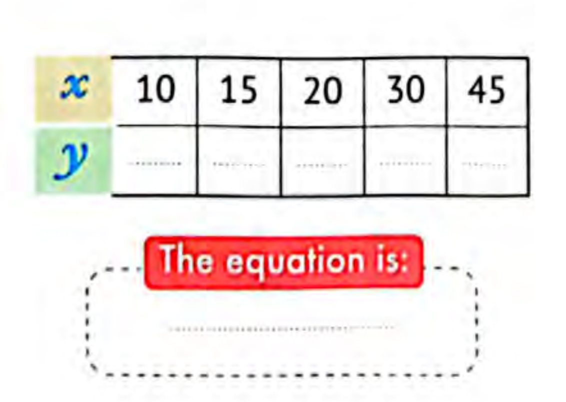


x	0	2	4	5	6
y	....	....	....	....	....

The equation is: ....

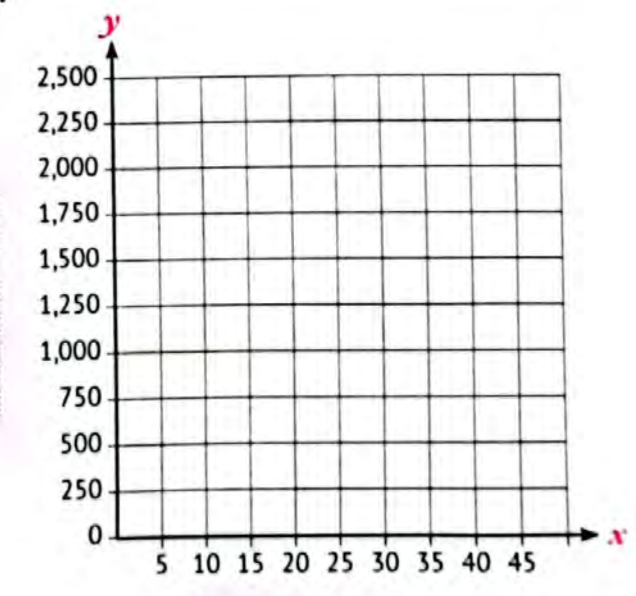


2 The value of participating in one of the school trips is 50 pounds. If the number of subscribers is "x" and the total value of subscriptions is "y", write an equation that shows the relationship between the number of subscribers and the total subscriptions. Complete the table and graph it.



x	10	15	20	30	45
y	....	....	....	....	....

The equation is: ....



Theme 2



10

1 Complete the following:

a. The independent variable is represented on the .... -axis.

b. The dependent variable is represented on the .... -axis.

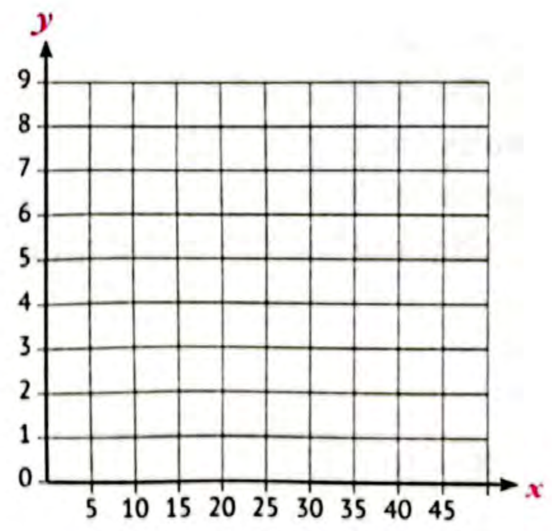
c. x-axis is the .... axis.

d. .... -axis is the vertical axis.

e. .... is the number of units in one quantity that corresponds to one unit in a second quantity.

2 If the equation is $y = \frac{1}{5}x$, then complete the following table and graph it:

x	10	15	20	30	45
y	......	......	......	......	......







Data and Statistical Questions

Learn: Statistical Questions and Non-Statistical Questions

The type of question is determined through the data we get from answering these questions.

Statistical Question

- It's a question to which we get many possible answers.

Ex. How old are the students in your class?

It is a statistical question because we expect a change in the ages of the students.

Non-Statistical Question

- It's a question to which we get only one answer.

Ex. "How old are you?"

It is a non-statistical question because we expect only one answer.

1 Select the type of each of the following questions:
(a statistical question or a non-statistical question)

	The question	Statistical	Non-Statistical
a	What are the students' favorite colors?		
b	How many family members does each student have in the class?		
c	How many students are in the class?		
d	How many books do the class students read in a year?		
e	What is the name of your school?		
f	Do you like the red color?		
g	How many emails do students write?		
h	How many books have you read in the last year?		



Types of Statistical Questions

The type of statistical question is determined by the type of data we get from answering these questions.

A Numerical Statistical Question

results in numerical (quantitative) data.

It is data written in the form of numbers to express the measurement of a specific phenomenon.



Weight, temperature, height, age, number of working hours, ...

A Categorical Statistical Question

results in descriptive data.

It is data that does not include numbers, and is written in the form of adjectives or words to describe the status of members of society.



Marital status, favorite food, favorite color, place of birth, blood type, ...

2 Determine whether the results from each question would give you numerical data or categorical data.

	Question	Numerical Data	Categorical Data
a	How many letters are in the first name of each student in your class?		
b	What are the favorite colors of the students in your class?		
c	What kinds of films do the students in your class like?		



d	What color are the eyes of the students in your class?		
e	How many people do each of the students in your class have in their families?		
f	What television programs do the students in your class prefer?		
g	What are the scores of all your math tests during the current evaluation period?		
h	How many pets do pupils have in your class?		

Quiz

10

1 Complete the following:

a The types of statistical questions are .... questions and .... questions.

b The types of statistical data are .... data and .... data.

c The numerical data is written in the form of ....

d The categorical data is written in the form of ....

e "What color are the pupils' eyes in your class?" is a .... question. (statistical / non-statistical)

2 Choose the correct answer:

a .... are categorical data. (Dates of birth or Ages or Weights or Favorite colors)

b .... are numerical data. (Salaries or Favorite sports or Eye colors or Nationalities)

c All following data are categorical data, except .... (birth places or lengths or names or colors)

d All the following data are numerical, except .... (types of pets or test scores or ages or number of pets)

e "What is your weight?" is a .... question. (numerical statistical or categorical statistical or non-statistical)



Exploring the Histogram
Representing Data Using Histograms

Remember

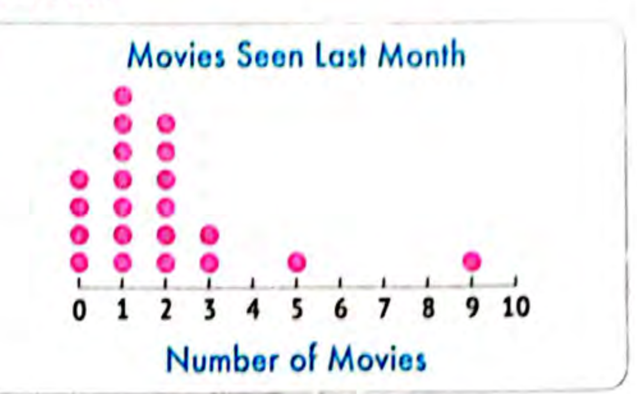
Dot Plots

- It is used to represent repeated numerical data on a **horizontal** number line.

Ex. **The following dot plot represents the number of movies that 20 people have watched last month**

Characteristics that all dot plots share:

- Dot plots should have **titles**.
- Dot plots should have data graphed above a **number line**.
- Each individual piece of data can be seen on a dot plot and is represented by a **dot**.

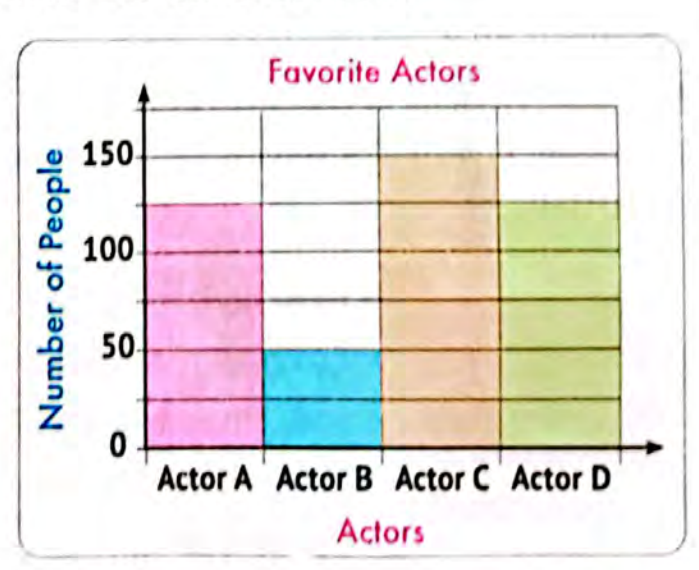


- The number lines in dot plots should be labeled with the **units** used to measure the **data**.

Bar Graph

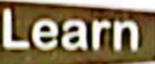
- It is used to represent categorical and numerical data.

Ex. **The opposite bar graph shows the preferred actors of a number of people.**





Theme 2

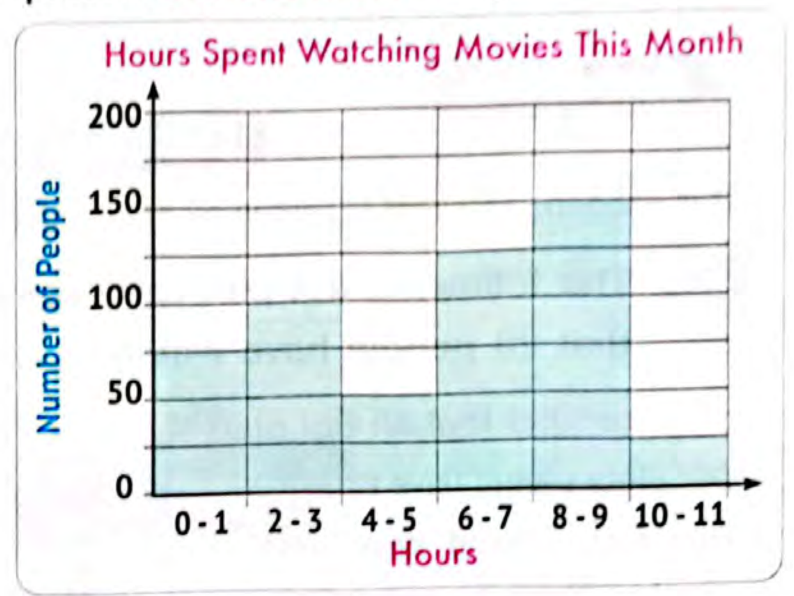


Histograms

It is used to represent numerical data only.



The opposite histogram represents the number of hours spent watching movies by a number of people.



Comparing Bar Graphs and Histograms

Bar Graph

- It can show categorical and numerical data.
- Each bar represents one number, one number interval, or one category.
- The horizontal axis does not need numbers on it.
- It requires equal spaces between each bar or different color for each bar.

Histogram

- It displays numerical data.
- The horizontal axis has numerical intervals.
- It has no space between the bars unless there is no data for a particular interval.
- It requires intervals to be non-overlapping with the same width.

Both of Bar Graphs and Histograms

- Have horizontal and vertical axes.
- Can display numerical data.
- Have titles and labels for both axes.
- Need a scale for the vertical axis.
- Use bars to represent the data.



1 What is the **best graph** for the following situations?

ⓐ How many students got grades in the final exam from 80 to 89? (   )

ⓑ What are all the students' heights rounded to the nearest centimeter in your class? (   )

ⓒ What are the favorite colors of the students in your class? (   )

ⓓ What are the math test scores for the month of November? (   )

ⓔ How many films are 60 to 80 minutes long? (   )

ⓕ What is the number of amusement park visitors during the week days? (   )

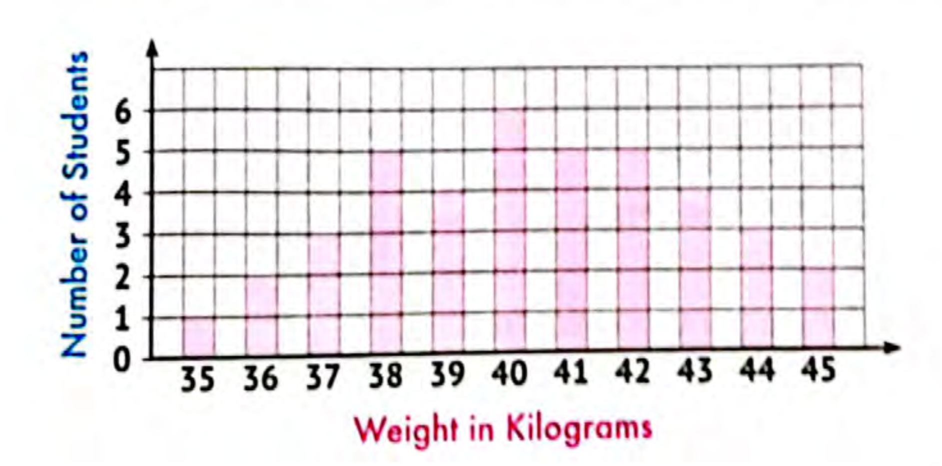
Learn

Creating Histograms to Represent Data

Ex. **The following frequency table shows the weights of the students of a class consisting of 40 students.**

- It can be represented graphically by columns, as follows:

Weight in Kilograms	35	36	37	38	39	40	41	42	43	44	45
Frequency (Number of Students)	1	2	3	5	4	6	5	5	4	3	2





To Create a Histogram to Display the Previous Data

- This data must be placed in suitable intervals, as follows:

1 Determine the range, which is the difference between the largest value and the lowest value (45 – 35 = 10).

2 Choose an interval size that makes sense for this data set.

So that each interval consists of 3 items, and therefore the number of intervals is (4).

3 Compile the previous frequency table, as follows:

Weight in Kg	Frequency
35	1
36	2
37	3
38	5
39	4
60	6
41	5
42	5
43	4
44	3
45	2

Intervals	Frequency
35 – 37	6
38 – 40	15
41 – 43	14
44 – 46	5



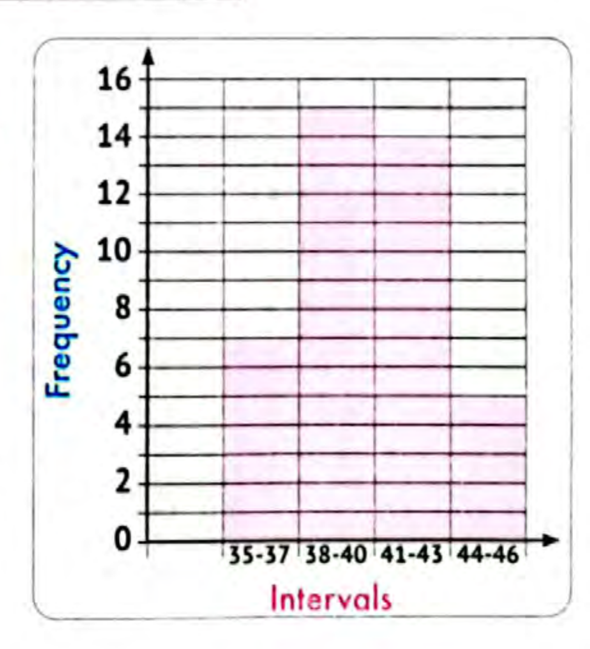
$10 \div 3 = 3\frac{1}{3}$

(4 intervals)

- Because we always choose the next integer of the quotient when quotient is not an integer.

To create a histogram using the previous frequency distribution table:

- On the horizontal axis, place the **intervals**.
- On the vertical axis, place frequencies. Label this axis **"Frequency"**.
- Draw a **bar** for each interval without leaving spaces between these bars as shown in the opposite figure.





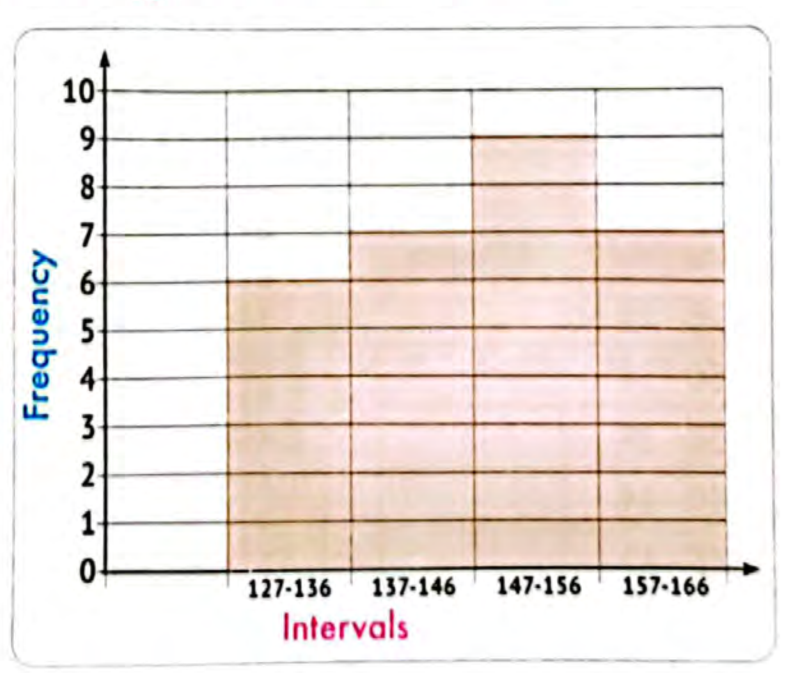
The following frequency table shows the data collected by the students. Draw a histogram showing this data. Make sure to choose an appropriate interval for this data set:

Arm Span (cm)	Frequency
127	2
132	3
135	1
138	1
141	1
142	2
143	1
144	2

Arm Span (cm)	Frequency
147	2
149	2
152	3
153	2
157	2
158	3
160	1
166	1

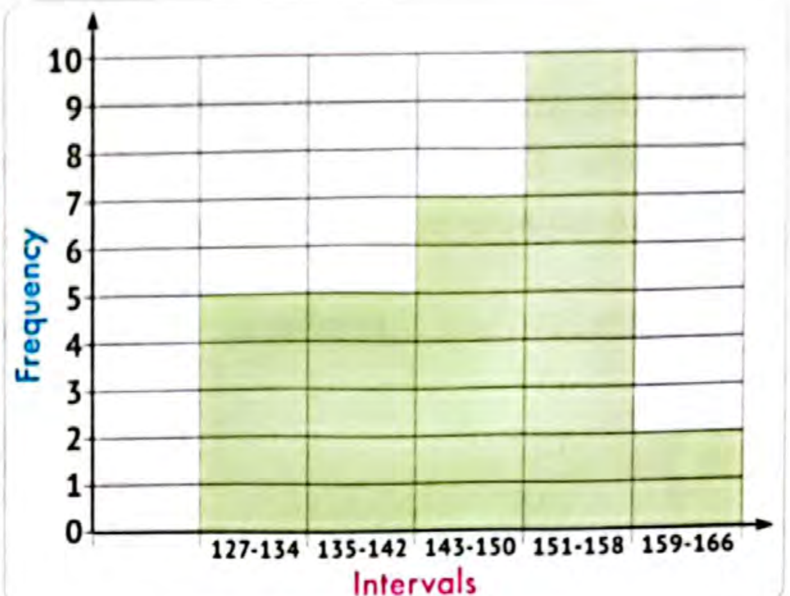
- From the previous table, we find that the range is (166 – 127 = 39).
- To draw the histogram, we make a table of intervals where the length of the interval is **10** items.
- The number of intervals is ($\frac{39}{10}$ = 3.9 ⟶ 4 intervals).

Intervals	Frequency
127 – 136	6
137 – 146	7
147 – 156	9
157 – 166	7



- Intervals of length 8 items can be created.
- The number of intervals is $\left(\frac{39}{8} = 4\frac{7}{8} \rightarrow 5 \text{ intervals}\right)$.

Intervals	Frequency
127 - 134	5
135 - 142	5
143 - 150	7
151 - 158	10
159 - 166	2

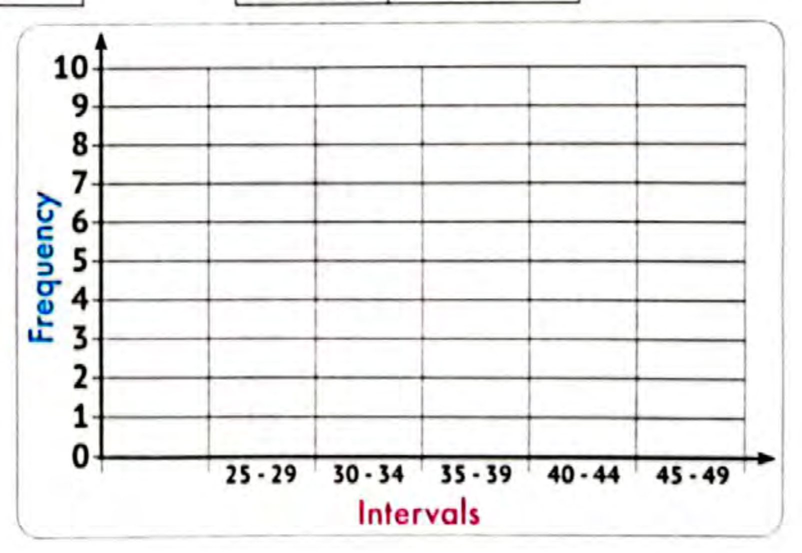


2 **The following frequency table shows the grades obtained by 32 students in mathematics in the first semester:**

Grades	Frequency
25	3
26	1
28	3
30	1
32	2
34	1
35	1
36	2
38	1

Grades	Frequency
39	2
40	1
42	3
44	1
45	3
46	1
47	1
48	3
49	2

Intervals	Frequency
25 - 29	
30 - 34	
35 - 39	
40 - 44	
45 - 49	



Quiz

10

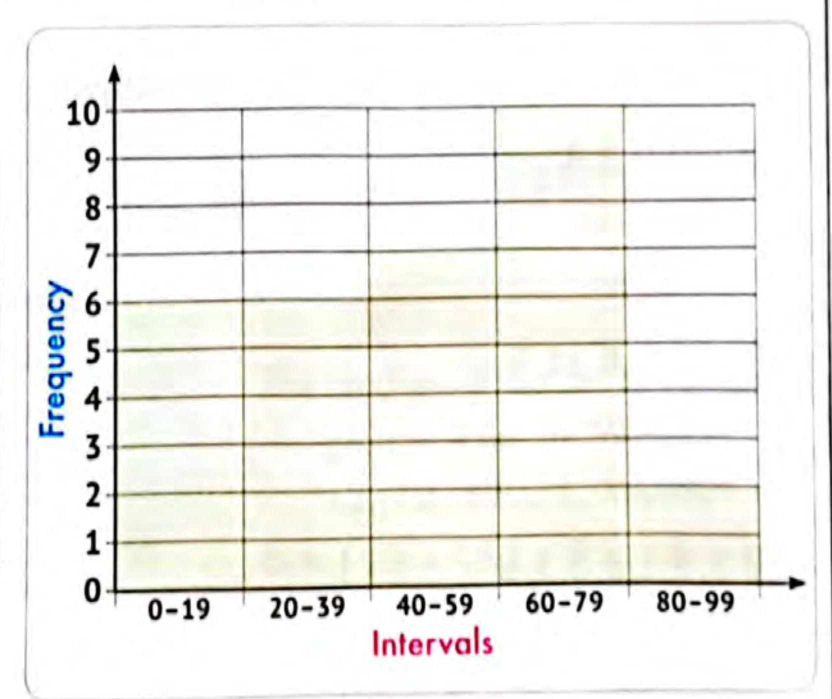


1 Match each of the following situations with the best graph to represent it:

a. How many students do their families consist of 4 people?	•	• Histogram 1
b. How many sixth-grade students are there in your school?	•	• Dot Plots 2
c. How many students in your class are 130 – 150 cm tall?	•	• Bar Graph 3

2 Use the following histogram to complete the following interval table:

Intervals	Frequency
0 – 19	....
20 – 39	....
40 – 59	....
60 – 79	....
80 – 99	....









Exploring Box Plot

Learn

The Median

- It's the value of the element appearing at the center of the data set when the data are arranged in order, if the data set contains an even number of values.
- If the data set has an even number of values, then the median is the quotient of dividing the sum of the two numbers in the center of the ordered data by 2.

Ex. Write the median for each of the following data sets:

ⓐ 3, 5, 8, 3, 7

The order: 3, 3, 5, 7, 8

Median: 5

ⓑ 7, 9, 3, 4, 4, 6

The order: 3, 4, 4, 6, 7, 9

Median: (4 + 6) ÷ 2 = 5

1 Find the median for each of the following data sets:

ⓐ 5, 9, 9, 2, 4

The order: .... , ... , ... , ... , ...

Median: ....

ⓑ 2, 0, 5, 8, 11, 7

The order: .... , ... , ... , ... , ... , ...

Median: ....

ⓒ 3, 9, 1, 8, 2, 3, 6

The order: .... , ... , ... , ... , ... , ... , ...

Median: ....

ⓓ 2, 0, 5, 8, 11, 6, 5, 7

The order: .... , ... , ... , ... , ... , ... , ... , ...

Median: ....

Learn

Box Plots

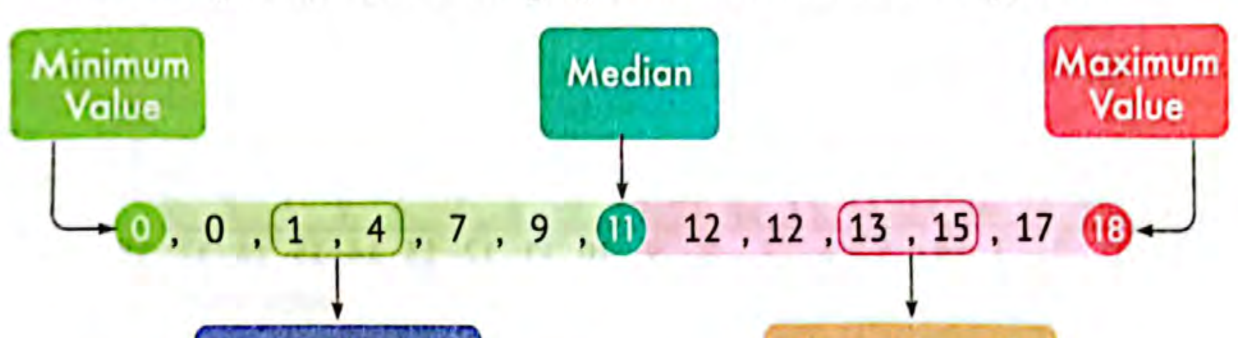
It's a data display that represents numerical data based on a 5-point summary of the data set.

1. The minimum value
2. The first quartile (Q1) or (Lower Quartile)
3. The second quartile (Q2) or (Median)
4. The third quartile (Q3) or (Upper Quartile)
5. The maximum value

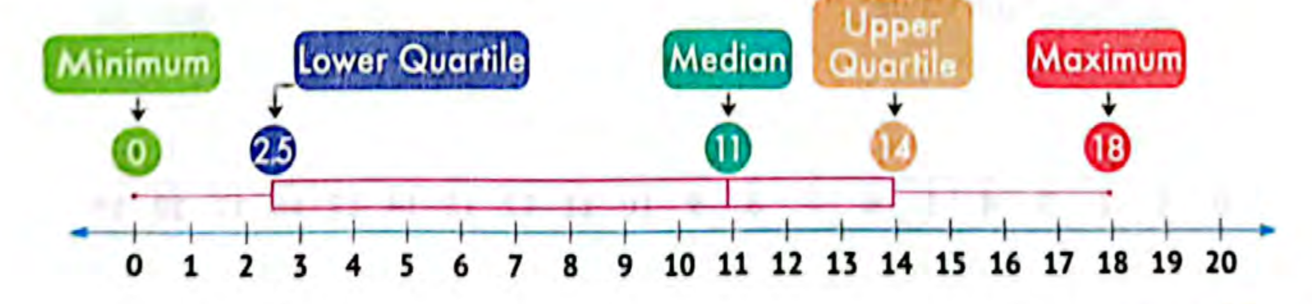
Ex. Draw a box plot to represent the following values:

15, 17, 13, 11, 12, 9, 0, 12, 18, 4, 7, 1, 0

- To draw a box plot for the set of displayed values, the 5-point summary must be specified after arranging this data in an ascending order:

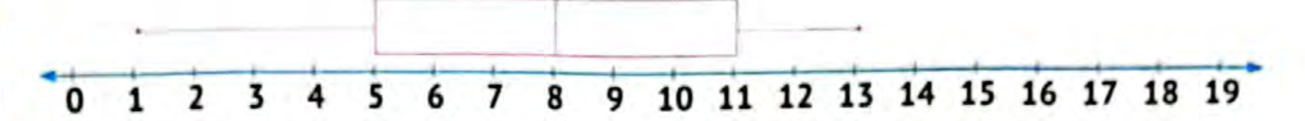


Lower Quartile	Upper Quartile
The median of the set of values, less than the median "0, 0, 1, 4, 7, 9"	The median of the set of values, greater than the median "12, 12, 13, 15, 17, 18"
Q1: $(1 + 4) \div 2 = 2.5$	**Q3:** $(13 + 15) \div 2 = 14$





2 **Using the following box plot, identify the 5-point summary of the data set:**



ⓐ Minimum Value: ....

ⓑ Lower Quartile: ....

ⓒ Median: ....

ⓓ Upper Quartile: ....

ⓔ Maximum Value: ....

3 **Draw the box plots for each of the following groups of values:**

ⓐ 2, 7, 10, 0, 2, 5, 6, 6, 12, 1

1. Minimum Value: ....
2. Lower Quartile: ....
3. Median: ....
4. Upper Quartile: ....
5. Maximum Value: ....

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

ⓑ 4, 6, 1, 2, 0, 5, 4, 2, 8, 9, 7, 8, 3, 7

1. Minimum Value: ....
2. Lower Quartile: ....
3. Median: ....
4. Upper Quartile: ....
5. Maximum Value: ....

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19



10

1 For the set of values: 3 , 11 , 7 , 2 , 3 , 8 , 7, complete:

a) Minimum Value: ....

b) Lower Quartile: ....

c) Median: ....

d) Upper Quartile: ....

e) Maximum Value: ....

2 Using the following box plot, identify the 5-point summary of the data set:



a) Minimum Value: ....

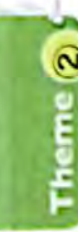
b) Lower Quartile: ....

c) Median: ....

d) Upper Quartile: ....

e) Maximum Value: ....





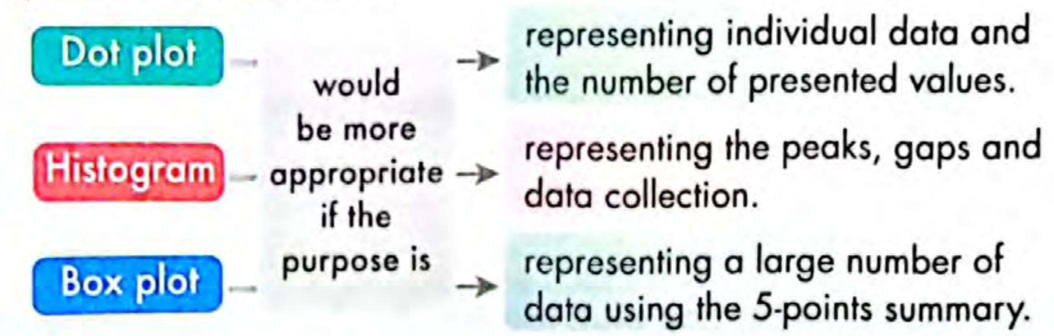


Applications on Data Representations

Learn

Dot Plot - Histogram - Box Plot

- Each of them is suitable for representing numerical data. To choose the most appropriate graph for a set of data, the purpose of using the graph must be determined.

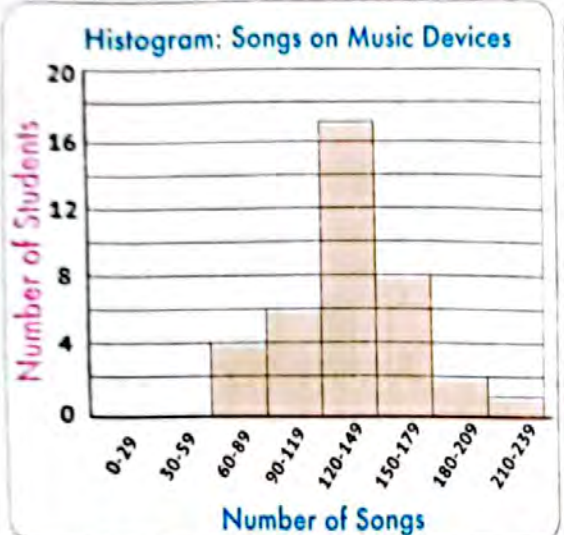


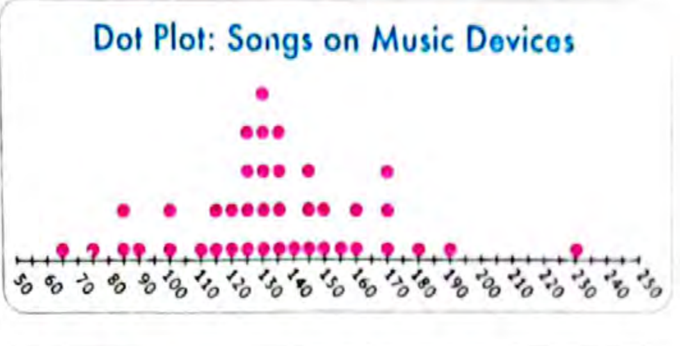
Examples of statistical questions that can be answered using the above representations:

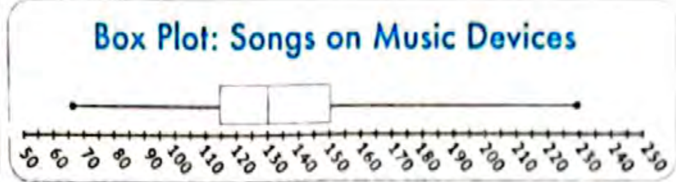
The question is about the	Dot Plot	Histogram	Box Plot
ⓐ Total number of values represented	✓	✓	
ⓑ Number of times each value is repeated	✓		
ⓒ Most frequent value	✓		
ⓓ Least frequent value	✓		
ⓔ Number of repetitions of values in a specified period	✓	✓	
ⓕ Number of repeated values for a set of periods	✓	✓	
ⓖ Range	✓		✓
ⓗ Gaps	✓	✓	
ⓘ Maximum value	✓		✓
ⓙ Minimum value	✓		✓
ⓚ 5-point summary	✓		✓
ⓛ Median	✓		✓



The following graphs represent the number of songs on sixth graders' phones or their musical devices:







Dot plot

- It shows the number of students and the number of songs that each of them has accurately.
- The largest number of songs for one student is **230** songs, and the least number is **65** songs.
- The number of the most repeated songs is 130 songs.

Histogram

- It explains that the largest number of songs a student has is from 210 to 239.
- It explains that the minimum number of songs a student has is from 60 to 89 songs.
- It explains that the number of the most common songs among the students is from 120 to 149 songs.

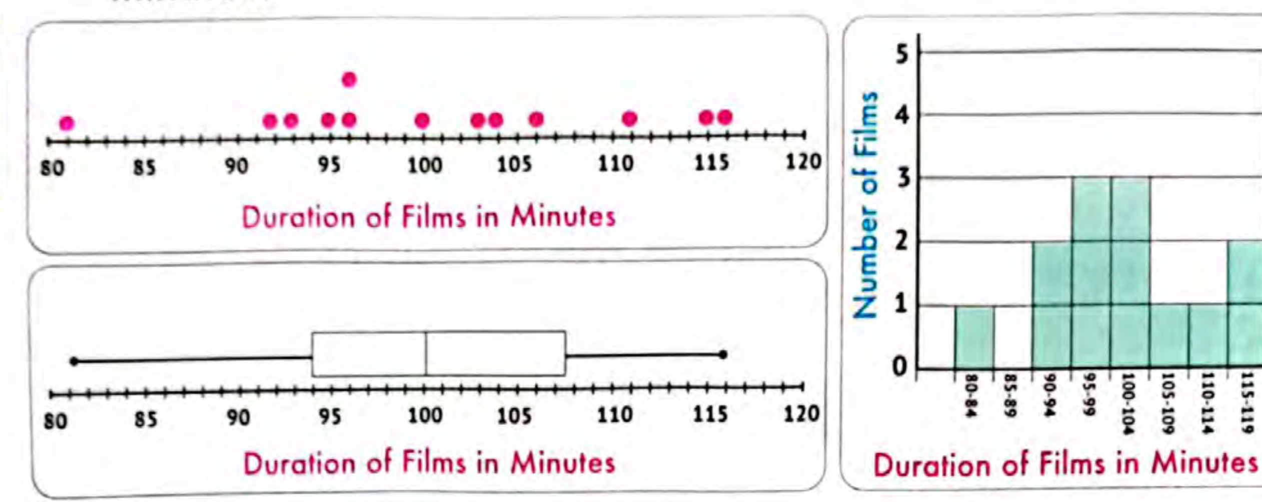
Box plot

- It explains that the largest number of songs for one student is 230 songs, and the least number is 65 songs.
- The median is 130, the first quartile is 115, and the second quartile is 150.

Important Note:

- There are questions that can only be answered through one of the previous graphs (dot plots), and other questions that can be answered through two graphs, and some questions can be answered through the three graphs.

1 **The following graphs show the duration of a number of films in minutes:**



a **Answer the following questions explaining the best graph that helps you in the answer:**

	Question	Answer	Graph		
			Dot Plot	Histogram	Box Plot
1	How many films are their duration graphically represented?				
2	What is the longest film?				
3	Exactly how many movies are 100 minutes long?				
4	How many movies are less than 90 minutes long?				
5	How many movies are from 105 to 115 minutes long?				
6	What is the median?				
7	How long are the most popular films?				

b **Write one question would be better to answer using:**

1. Dot plot: • ....
2. Histogram: • ....
3. Box plot: • ....

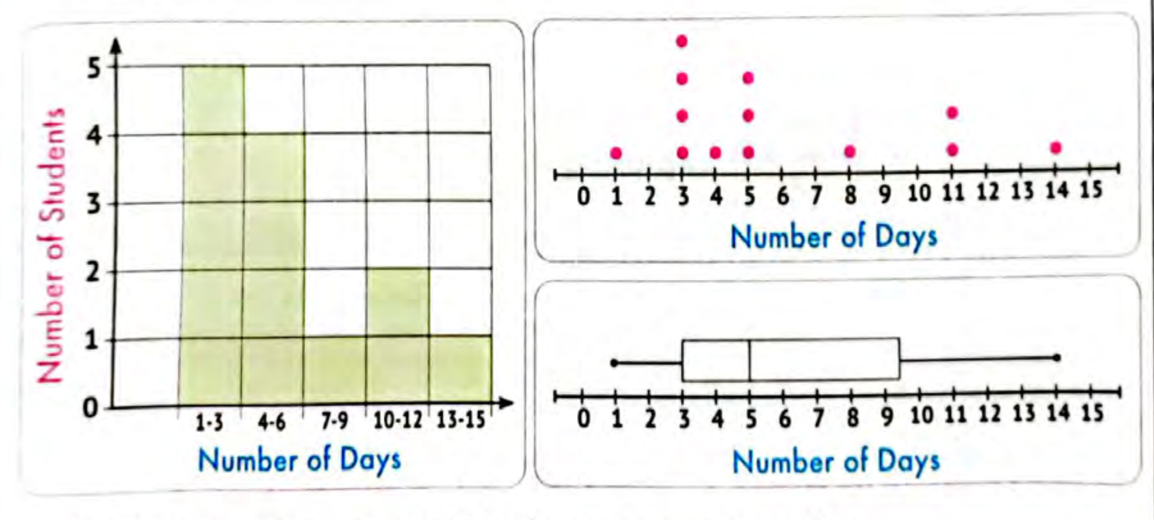
Quiz

10

1 Match each statistical question with the best graph that can be used to answer it:

a What is the most frequent value? •	• Histogram 1
b What is the most frequent interval? •	• Box Plot 2
c What is the upper quartile? •	• Dot Plot 3

2 The following graphs show the number of days absent for a group of students:



Write two questions would be better to answer using:

a Dot plot:

1 .... 2 ....

b Histogram:

1 .... 2 ....

c Box plot:

1 .... 2 ....



Exploring the Balance of Data Sets
Interpreting Arithmetic Mean



Learn

- Measures of central tendency (center) are a group of measures that describe a gathering point around central values. General measures of central tendency are the mean, median, and mode.

- The mean (average) of a group of numerals is the average value of that group of numbers. It is a single value that gives us an approximation of the values of the group.

It's a value that summarizes all values in a scalar data set and has a single value.

Ways to Find the Mean of a Set of Numerical Values

First: Finding the Mean by Finding the Balance Point

(The value of the center of a set of data)

- When representing data graphically using a dot plots graph, the mean of a set of data is the value of the balance point of that set of data.

Balance point (the center of a set of data)

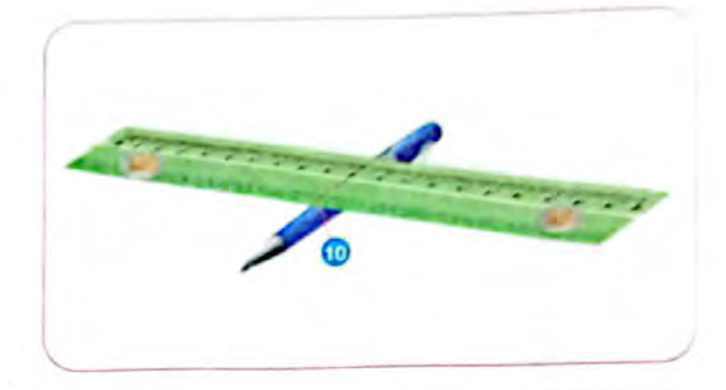
It's a point on a number line or in a data set in numerical order such that the numbers are balanced on both sides.



Theme 2

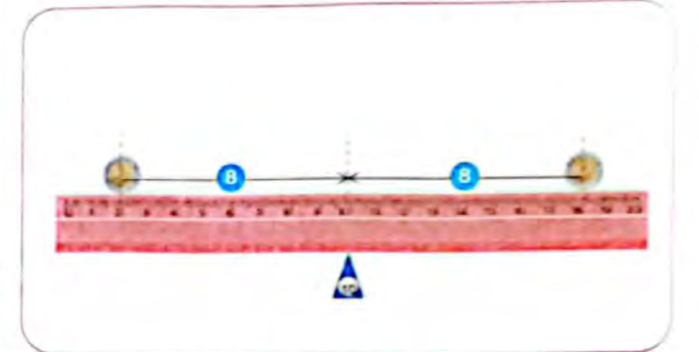
Balance Game

- Bring a ruler (20 cm), some coins, and a pen.
- Put a coin at number (2) and another coin at number (18) on the ruler and move it over the pen until it becomes balanced, as shown in the pictures.



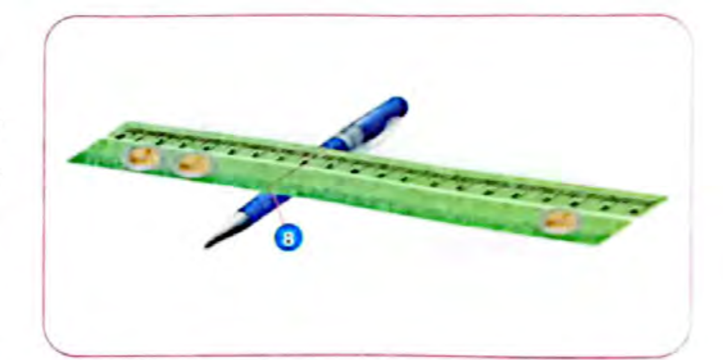
- **Notice** the position of the pen at which the ruler is balanced.

  You find it on number 10, which is the balance point.



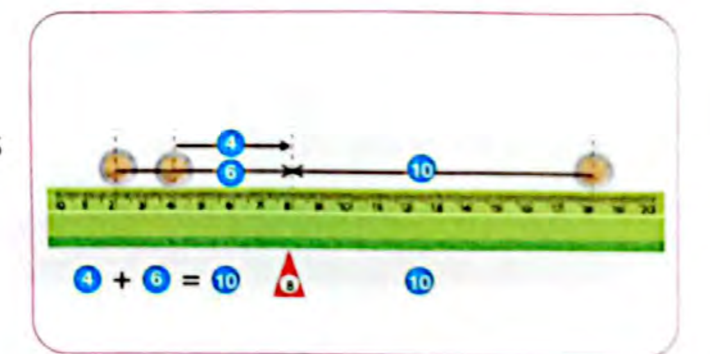
So, the mean of the two numbers 2 and 18 is 10.

- Add another coin at number (4) on the ruler and move it over the pen until it becomes balanced, as shown in the pictures.



- **Notice** the position of the pen at which the ruler is balanced.

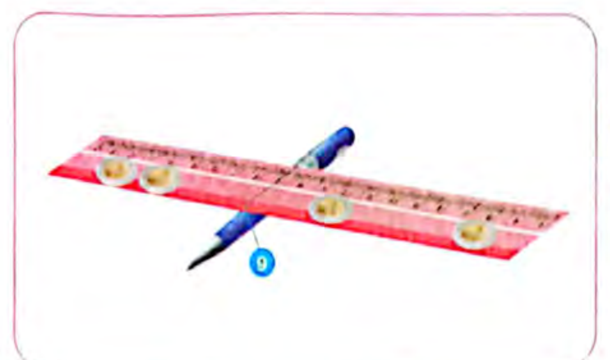
  You find it on number (8), which is the balance point.

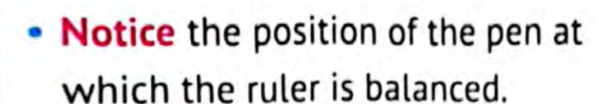


The mean of the numbers (2, 4, 18) is 8



- Add another coin at number (12) on the ruler and move it over the pen until it becomes balanced, as shown in the pictures.

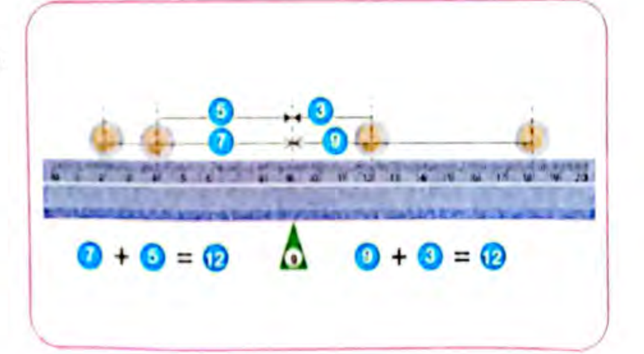




- **Notice** the position of the pen at which the ruler is balanced.

You find it on number (8), which is the balance point.

You You also find it on number (10), which is the balance point).



The mean of the numbers 2, 4, 12, 18 is 9.

Repeat the game, add more coins, and notice the change in the balance points with the change in the positions of the coins.

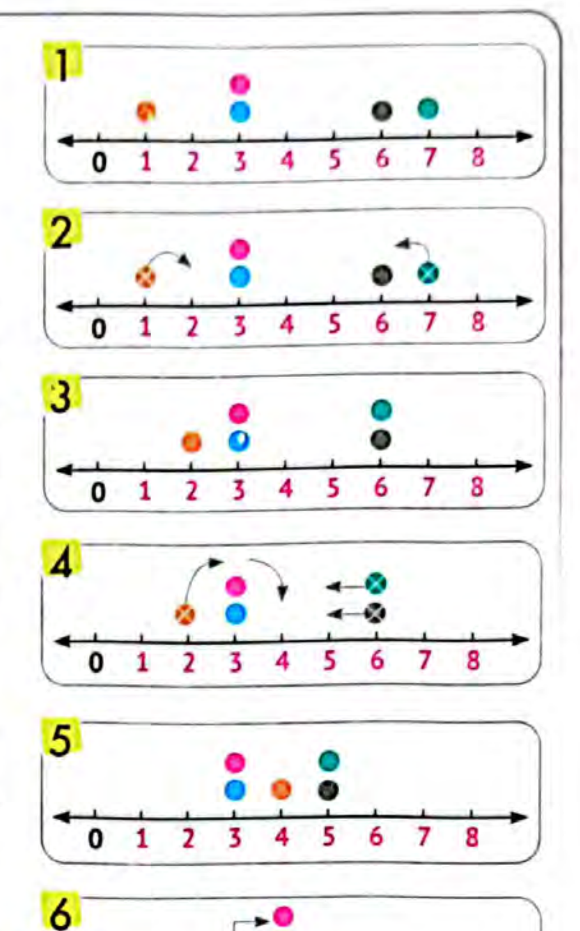


- If we add the distances between the numbers and the mean (the balance point) on each side, each time we find that the sum of these distances is always equal on both sides (balanced).

Theme 2

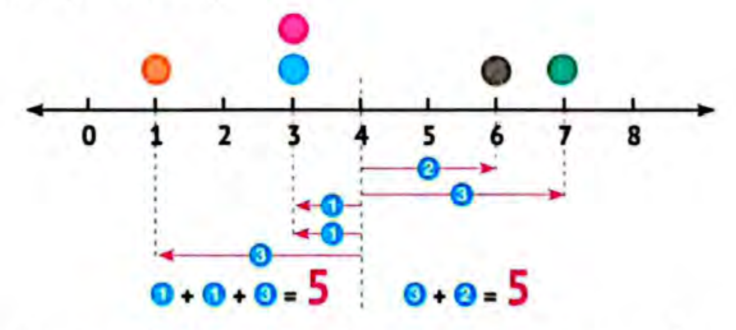
Ex.

Determine the mean (balance point) for the data represented using the following dot plot:



- We move the points from the edges to the inside, so that we move the same steps each time in opposite directions to the inside until all points gather at the same number, so that this number is the mean (data balance point).
- **Notice** that moving one point in two steps is equivalent to moving two points in one step.
- The number at which all points congregate is the center of this set of data. The mean is 4.

When adding the distances between the points and the mean from both sides, they must be equal (balanced).

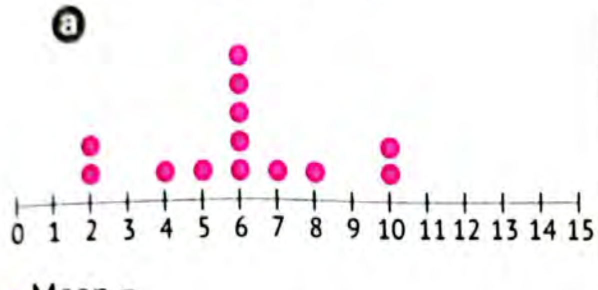


From the foregoing, we find that the data center represented using the previous point chart is number 4.

That is, the mean of the numbers 7, 6, 3, 3, 1 is 4.

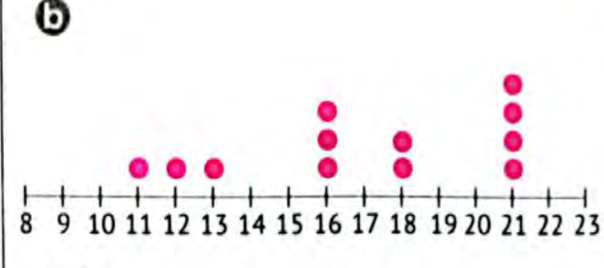
1 **Determine the mean (the center of the data set) for each of the following graphs:**

a



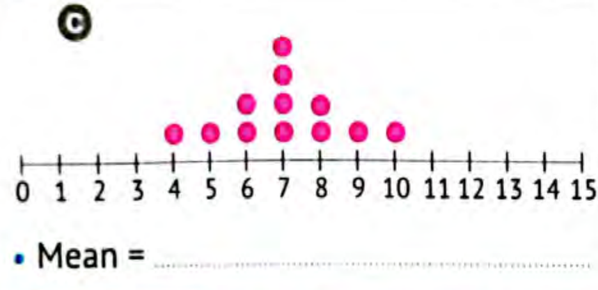
- Mean = ...

b



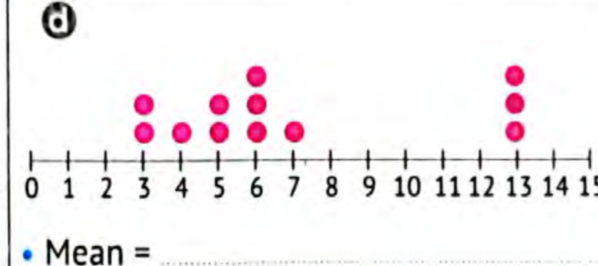
- Mean = ...

c



- Mean = ...

d



- Mean = ...

Second: The Mean Algorithm (the mean as a fair share)

- The mean of a set of values is equal to the sum of these values divided by their number.

Ex. **A group of students each has a number of pens, as shown in the table:**

Student	Mahmoud	Saleh	Hady	Mark	Nader
Number of Pens	6	7	2	3	7

- These students collected their pens together and redistributed them equally among themselves, so each of them had a share of:

$$\frac{6+7+2+3+7}{5} = \frac{25}{5} = 5 \text{ Pens}$$



- The redistribution has been made so that each of them has the same share, and this is the mean.

2 A group of friends collected their marbles and redistributed them equally among themselves. The following table shows the number of marbles that each of them owns.

Child	Sajid	Marwan	Fatima	Farida	Wafaa	Omar
Number of Marbles	8	9	12	7	3	9

Find the **share** of each of them after redistributing the marbles equally.

Ex. **Find the mean of the following values: (4, 11, 16, 20)**

$$\text{Mean: } \frac{4 + 11 + 16 + 20}{4} = \frac{51}{4} = 13\frac{3}{4}$$

3 **Find the mean for the following values:**

ⓐ 40, 38, 36, 34, 32

Mean = ...

= ....

ⓑ 25, 12, 3, 18

Mean = ...

= ....

ⓒ 3, 3, 5, 7, 2, 4, 7, 3

Mean = ...

= ....

ⓓ 52, 98, 60

Mean = ...

= ....

Ex.

If the mean of the values: 6, 7, x, 3 is 5, find the value of x.

Solution

Notice that: The mean x The number of values = The sum of the values

$6 + 7 + x + 3 = 4 \times 5$

$x + 16 = 20$

$x = 4$

Another Solution

$$\text{Mean: } \frac{6 + 7 + x + 3}{4} = 5$$

$$\frac{x + 16}{4} = 5$$

$x + 16 = 20 \longrightarrow x = 4$

4 Find the value of x in each of the following:

a) If the mean of the values 6, x, 7, 9, 7, 8 is 7.

....

....

b) If the mean of the values x, 5, 4, 9, 8 is 6.

....

....



10

1 Choose the correct answer:

a) The mean of the values: 45, 15, 40, 70, 80 is ....
(40 or 45 or 50 or 60)

b) If the mean of the values 12, 15, x, 8 is 10, then the value of x is ....
(40 or 5 or 20 or 10)

c) If the sum of 8 values equals 48, then the mean of these values is ....
(40 or 56 or 24 or 6)

d) If the sum of a set of values is 36, and the mean of these values is 6, then the number of these values is .... (6 or 42 or 30 or 216)

e) If the mean of 9 values is 5, then the sum of these values is ....
(45 or 14 or 4 or 95)

2 Determine the mean and the median for the following graph:

a) Mean: ....

b) Median: ....







Exploring Median, Mode, and Outliers

Learn

The Mode

The mode of a set of data is the most common (frequent) value in the set.

Some values might have

Only one mode

Ex.
- The values (5, 8, 5, 5, 6, 8, 5) have one mode, which is 5.

Because only 5 is the most frequent number.

More than one mode

Ex.
- The values (6, 5, 8, 6, 5, 7, 5, 6) have two modes, which are 5 and 6.

Because each of 5 and 6 are the most frequent numbers.

No mode

Ex.
- The values (8, 3, 9, 5, 4, 2, 10, 0) do not have a mode.

Because no value is repeated more than the others.



- The mode can be found for a set of categorical data.

Ex. The mode of the values (red, green, yellow, red, blue) is red

1 **Find the mode for each of the following set of values:**

	Values	Mode
a	6, 8, 3, 8, 5, 8, 3	....
b	7, 1, 2, 7, 6, 4, 3, 5	....
c	Car, plane, bus, bike, plane	....
d	2, 3, 2, 7, 8, 2	....
e	Orange, banana, grape, tangerine, guava	....
f	12, 15, 12, 10, 6, 7	....
g	10, 13, 10, 13, 7, 2	....



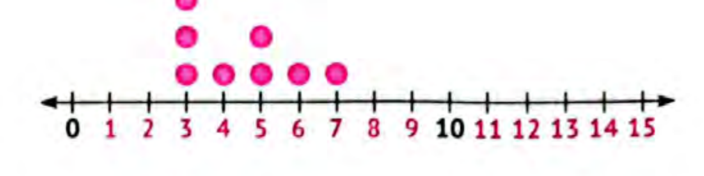
Outliers



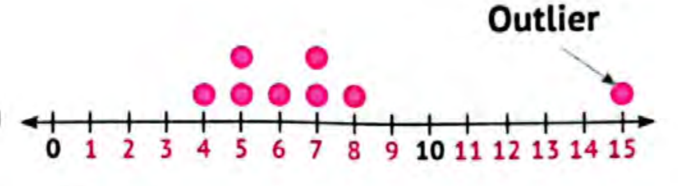
An outlier is the value that has a clear difference of increase or decrease from the rest of the values, and it can be defined in general as the value that differs in its behavior from the rest of the mentioned values.

Ex.

ⓐ
- Values: "6, 3, 7, 5, 3, 5, 4, 3"
- There are **no** outliers.
- Because all values are close to each other.



ⓑ
- Values: "7, 6, 5, 8, 7, 4, 15, 5"
- "15" is called an **outlier**.
- Because it is much higher than the other values.



ⓒ
- Values: "12, 15, 2, 1, 10, 15, 13, 11"
- "1 and 2" are called **outliers**.
- Because they are less than the other values.



2 **List the outliers in each of the following sets of values:**

	Values	Outliers
ⓐ	6, 8, 7, 5, 19	....
ⓑ	16, 17, 15, 18, 2	....
ⓒ	3, 2, 5, 6, 4, 5	....
ⓓ	24, 25, 3, 2, 27, 22	....
ⓔ	122, 118, 120, 119, 124	....
ⓕ	55, 65, 58, 11, 69	....



Theme 2

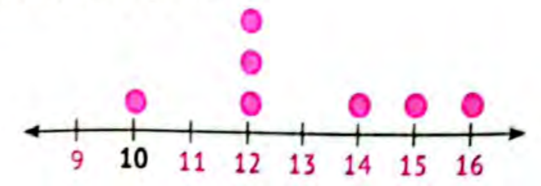
Mean, median, and outliers

Note the following examples to see the effect of outliers when calculating the mean and median of a set of values.

EX. Set of values: "10, 12, 12, 15, 12, 16, 14"

The mean is 13

and the median is 12.



In the previous example

- If the value 16 is replaced by another value, such as 56, then the set of values becomes: "10, 12, 12, 15, 12, 58, 14".

So, the mean: 19 and the median: 12

- If the value 10 is replaced by another value, such as 3, then the set of values becomes: "3, 12, 12, 15, 12, 16, 14".

So, the mean: 12 and the median: 12



The mean **is affected by** outliers in the data set.

The mean { increases if the outliers are greater than the other values. / decreases if the outliers are less than the other values.

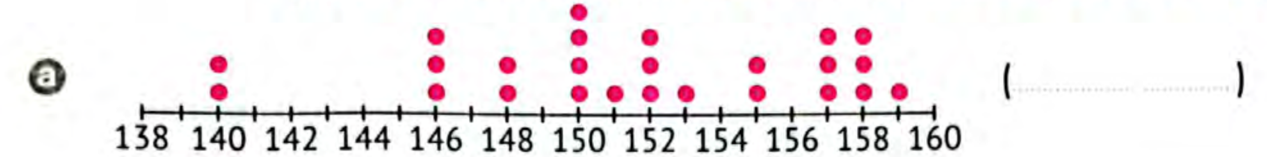
The median **is not affected by** outliers in the data set.

It is preferable to use:

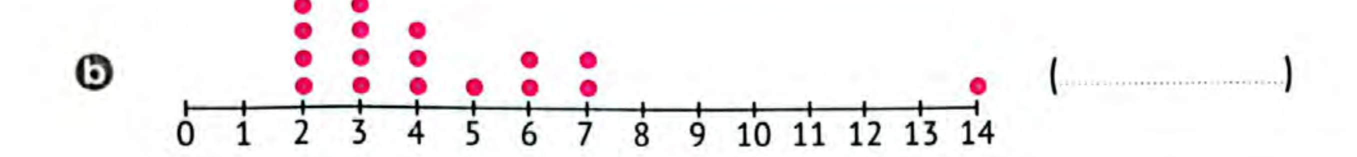
- The median as a measure of the central tendency if the data has outliers at one side only.
- The mean as a measure of the central tendency if the data does not have outliers.

3 **Use reasoning to assign each of the given descriptions to the related graph:**

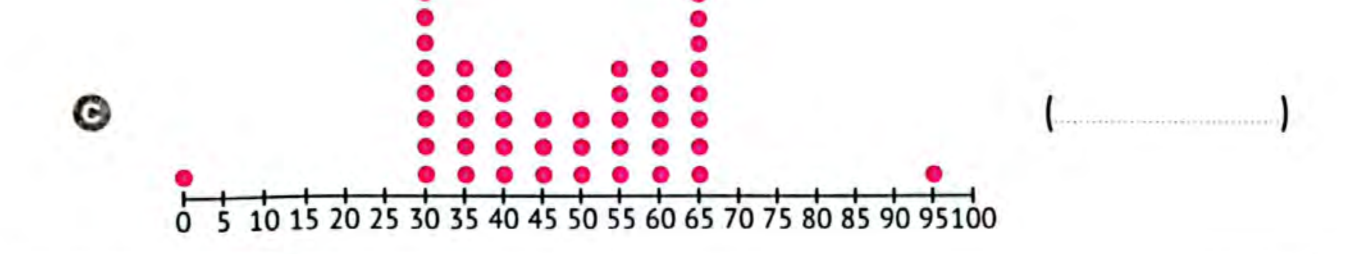
(Mean increases, Mean decreases, Mean stays the same)

a 

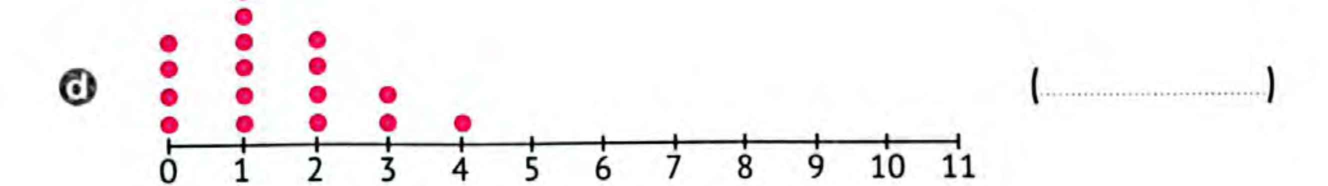
(....................)

b 

(....................)

c 

(....................)

d 

(....................)

When representing data graphically using a dot plot:

If the graph is

- skewed to one side, the median is the best choice as a measure of central tendency.

  Ex.

- evenly distributed, the mean is the best choice as a measure of central tendency.

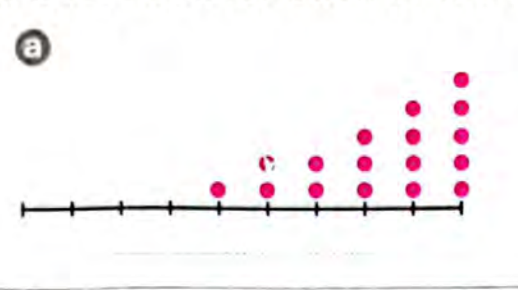
  Ex.

- symmetrical, then both the median and the median are suitable as measures of central tendency.

  Ex.

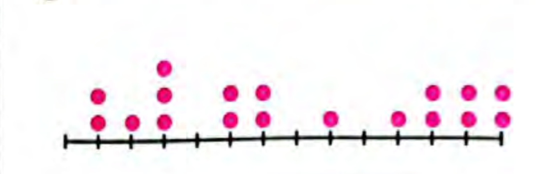
4 Choose the **measure of central tendency** that you think would be best used for each of the following graphs, **mean or median**:

ⓐ



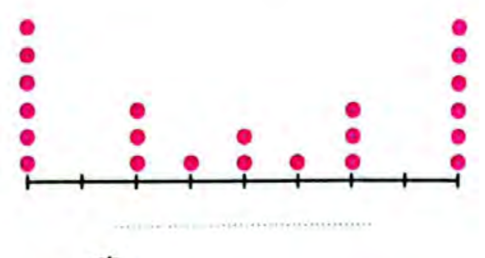
....

ⓑ



....

ⓒ



....



10

1 Choose the correct answer for the values (2, 6, 7, 23, 2, 1, 8):

ⓐ The mode: .... (6 or 7 or 2 or 23)

ⓑ The median: .... (6 or 7 or 2 or 23)

ⓒ The mean: .... (6 or 7 or 2 or 23)

ⓓ The outlier: .... (6 or 7 or 2 or 23)

(45 or 14 or 4 or 95)

2 Using the following dot plot, complete:

ⓐ The mode: ....

ⓑ The median: ....

ⓒ The mean: ....

ⓓ The outlier: ....

0 1 2 3 4 5 6 7 8 9 10 11

ⓔ The measure of center that you think would be best used for this graph is .... (mean or median)



Exploring the Range



Learn

- **Measure of variability:** it's a single value that indicates the spread of data in a set.
- **The range** of the data is the amount of spread among all the data collected. This value is calculated by finding the difference between the maximum and minimum data values.



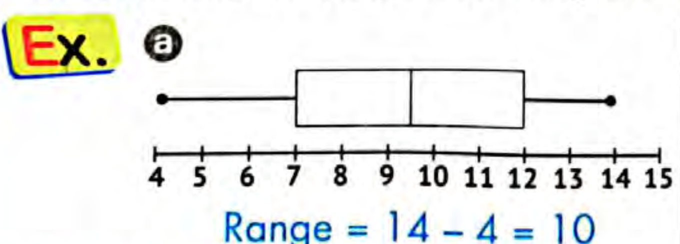
The range for the set of values "6, 3, 7, 2, 9, 5" is $9 - 2 = 7$.



- **It is easier to find the range using a dot plot or box plot.**

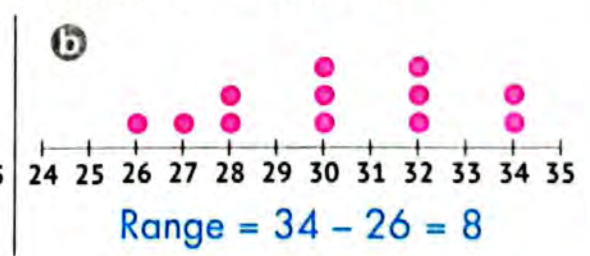
Because each of them shows the greatest value and the least value.

Ex. ⓐ



Range = $14 - 4 = 10$

ⓑ



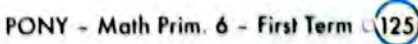
Range = $34 - 26 = 8$

- **The histogram** does not show individual data points, and the data is aggregated into intervals. Therefore, the range cannot be found using a histogram.
- **The tables** can be trickier because the values are not ordered from smallest to largest.

Ex. **The following table shows Nour's scores in quizzes. What is the average score for her quizzes?**

Quiz	1	2	3	4	5	6	7	8
Scores	18	15	17	20	18	19	18	15

- **Lowest score:** 15
- **Highest score:** 20
- **The range:** $20 - 15 = 5$

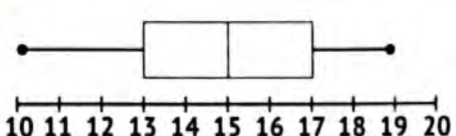



1 Find the range for each of the following set of values:

	Values	Range
a	6, 3, 5, 9, 2, 2	....
b	25, 36, 75, 15, 36, 14	....
c	9, 25, 78, 6, 14	....
d	5, 2, 7, 13, 9, 12	....
e	55, 40, 12, 11, 45	....

2 Use each of the following graphs to find the range:

a

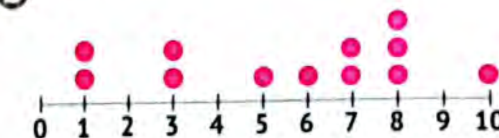


Largest value: ....

Least value: ....

Range: ....

b

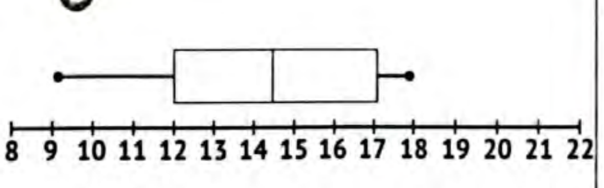


Largest value: ....

Least value: ....

Range: ....

c

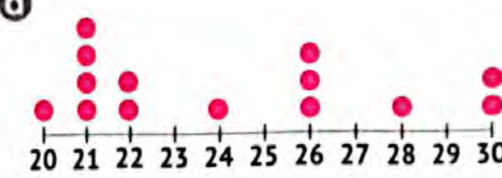


Largest value: ....

Least value: ....

Range: ....

d



Largest value: ....

Least value: ....

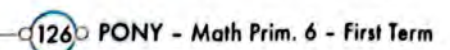
Range: ....

3 Find the range in each of the following:

a The following table represents the temperatures recorded in one of the cities in a week.

Day	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Temperature	25°	28°	30°	22°	24°	26°	25°

- Largest value: ....
- Least value: ....
- Range: ....





ⓑ The following table represents the number of hours Hatem spent studying for 5 days:

Day	First	Second	Third	Fourth	Fifth
Number of Hours	4	5	6	3	5

• Largest value: .... • Least value: .... • Range ....

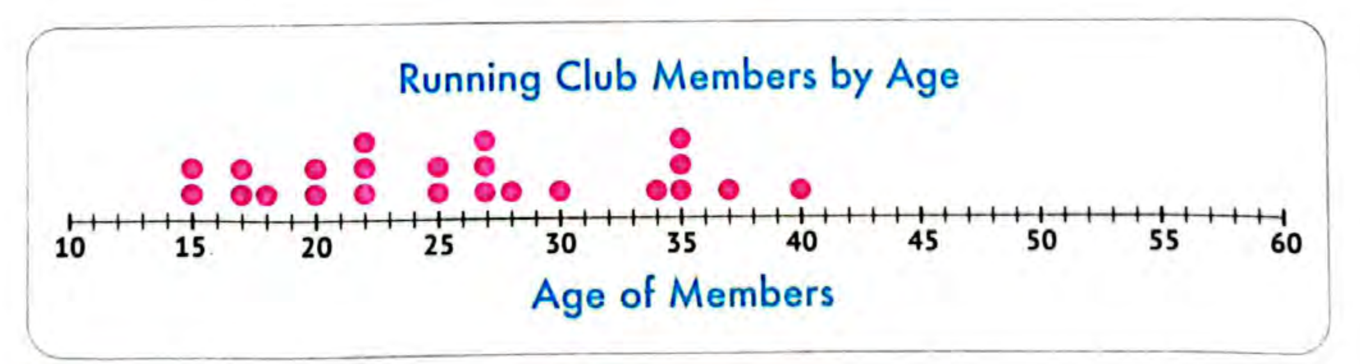


Outliers and Range

The range is affected by outliers in the data set.

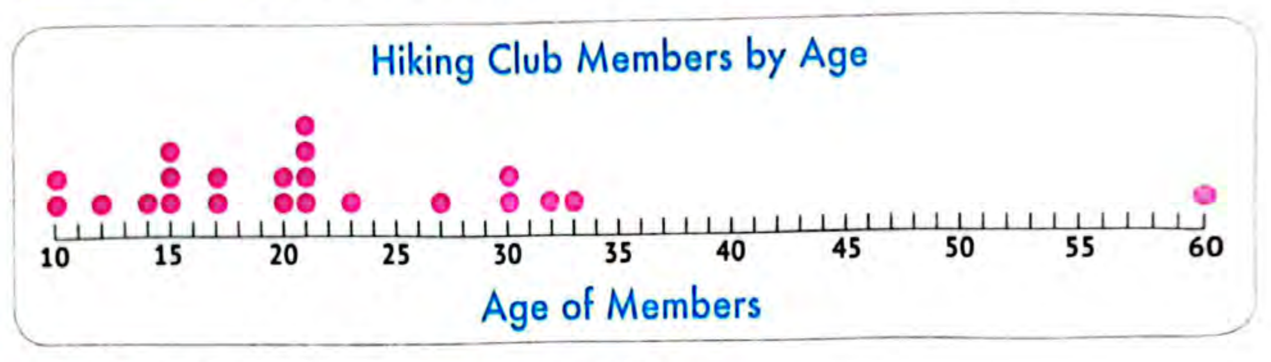
Therefore, it is useful to know the measures of dispersion (range) in addition to the measures of the central tendency (median) when analyzing data in which there are outliers.

Ex. **This is the comparison of the two dot plots showing the ages of members in a running club versus the members of a hiking club:**



• **Range:** 40 – 15 = 25 • **Median:** 25

• **Note that** the range accurately describes the data and that the age range is 25.



- **Range:** 60 - 10 = 50
- **Median:** 20.5
- An outlier results in a larger range, but the majority of members have a shorter life span if the outlier is excluded.

So the range is a good measure for the data when there are no outliers.

Quiz

10

1 Choose the correct answer for the values (12, 16, 2, 15, 12, 14, 13):

ⓐ The range: .... (12 or 2 or 13 or 14)

ⓑ The mode: .... (12 or 2 or 13 or 14)

ⓒ The median: .... (12 or 2 or 13 or 14)

ⓓ The mean: .... (12 or 2 or 13 or 14)

ⓔ The outlier: .... (12 or 2 or 13 or 14)

2 Use the opposite box plot to complete:

ⓐ The range: .... ⓑ The median: ....

ⓒ The outlier: ....

0 1 2 3 4 5 6 7 8

3 Use the opposite dot plot to complete:

ⓐ The range: ....

ⓑ The median: ....

0 1 2 3 4 5 6 7 8

Unit 1 Division, Factors, and Multiples

Concept 1.1 Division Algorithm, GCF, and LCM

Lesson 1 Divisibility

1 Complete the following table:

	Division	Quotient	Remainder	Divisible/ Not Divisible
a	45 ÷ 5	....	....	45 is .... by 5
b	25 ÷ 4	....	....	24 is .... by 4
c	60 ÷ 7	....	....	60 is .... by 7
d	78 ÷ 6	....	....	78 is .... by 6
e	35 ÷ 4	....	....	35 is .... by 4
f	81 ÷ 9	....	....	81 is .... by 9
g	28 ÷ 7	....	....	28 is .... by 7
h	19 ÷ 4	....	....	19 is .... by 4
i	120 ÷ 4	....	....	120 is .... by 4
j	154 ÷ 5	....	....	154 is .... by 5
k	245 ÷ 5	....	....	245 is .... by 5
l	451 ÷ 3	....	....	451 is .... by 3
m	102 ÷ 4	....	....	102 is .... by 4
n	208 ÷ 2	....	....	208 is .... by 2

2 Circle the number which is divisible by 2:

30	65	97	54	26
258	216	925	743	250
151	368	654	239	2,544

3 Circle the number which is divisible by 3:

45	36	28	456	558
457	777	891	4,054	3,332
652	100	12,748	445	4,662

4 Circle the number which is divisible by 4:

32	46	82	203	612
440	2,100	2,003	1,054	3,636
32,100	65,002	40,056	63,122	30,008

5 Circle the number which is divisible by 5:

45	36	250	156	558
154	830	940	630	2,005
354	101	12,745	55,551	1,20

6 Use the following numbers to complete:

335 532 711 650 345 762 900

a) The numbers which are divisible by 2: ....

b) The numbers which are divisible by 3: ....

c) The numbers which are divisible by 4: ....

d) The numbers which are divisible by 5: ....

e) The numbers which are divisible by 6: ....

f) The numbers which are divisible by 10: ....

7 Complete the table using (✓) or (✗):

	Number	Divisible by...					
		2	3	4	5	6	10
a	15	....	....	....	....	....	....
b	28	....	....	....	....	....	....
c	30	....	....	....	....	....	....
d	130	....	....	....	....	....	....
e	600	....	....	....	....	....	....
f	102	....	....	....	....	....	....
g	750	....	....	....	....	....	....
h	405	....	....	....	....	....	....
i	2,300	....	....	....	....	....	....
j	4,256	....	....	....	....	....	....

8 Complete the following:

a) Any number is divisible by another, if the remainder of the division operation is ....

b) 36 ÷ 5 = 7 and R1, so 36 is .... by 5.

c) All even numbers are divisible by ....

d) A number is divisible by 2 if its ones digit is .... , ... , ... , ... or ....

e) A number is divisible by 3 if the sum of its digits is a multiple of ....

(f) 652 is not divisible by 3 because 6 + 5 + 2 = 13,

and 13 is .... of 3.

(g) A number is divisible by 4 if the Ones and Tens digits of the number

are divisible by ....

(h) If the Ones digit of a number is 0 or 5, then the number is divisible

by ....

(i) 3 is a factor of 12, so .... is divisible by ....

(j) 24 is a multiple of 4, so .... is divisible by ....

(k) 28 is divisible by 7 because .... is a multiple of ....

or .... is factor of ....

9 Choose the correct answer:

(a) 26 is divisible by .... (2 or 3 or 4 or 6)

(b) .... is divisible by 3. (133 or 236 or 304 or 213)

(c) If the Ones digit of a number is zero, then it is divisible by ....

(5 only or 2 and 5 only or 5 and 10 only or 2, 5 and 10)

(d) The smallest 2-digit number which is divisible by 2 and 3 is ....

(0 or 6 or 12 or 18)

(e) The smallest 2-digit number which is divisible by 2 and 5 is ....

(0 or 5 or 10 or 15)

(f) The smallest 2-digit number which is divisible by 6 is ....

(0 or 6 or 12 or 18)

(g) If 51 divisible by 3, then 51 is a .... of 3. (multiple or factor)

(h) "35 + ... " is divisible by 3. (0 or 1 or 2 or 3)

Assessment on Lesson 1

Unit 1

1 Complete the following:

ⓐ 30 is divisible by 6 because 6 x .... = 30.

ⓑ The number 4,101 is divisible by ....

ⓒ All even numbers are divisible by ....

ⓓ If 25 is multiple of 5 then, 25 is .... by 5.

2 Choose the correct answer:

ⓐ .... is divisible by 2 and 3. (23 or 81 or 18 or 21)

ⓑ The number 108 is divisible by the two prime numbers 3 and .... (2 or 5 or 7 or 11)

ⓒ All the .... numbers are divisible by 2. (odd or even or prime or whole)

ⓓ .... is the smallest number divisible by each of 2 and 5. (5 or 10 or 15 or 20)

3 Use the numbers 816 , 720 , 4,955 and 1,239 to complete:

ⓐ The numbers divisible by 2 are ....

ⓑ The numbers divisible by 3 are ....

ⓒ The numbers divisible by 4 are ....

ⓓ The numbers divisible by 5 are ....

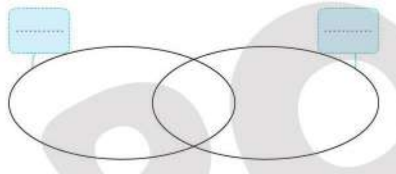
ⓔ The numbers divisible by 6 are ....

ⓕ The numbers divisible by 10 are ....

Lesson 2 Factorizing a Number to Its Prime Factors

1 **Find the GCF and LCM using the Venn diagram in each of the following:**

ⓐ 6 and 8





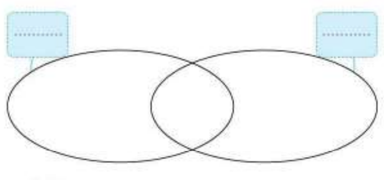
GCF = ...

LCM = ...

6 = ...

8 = ...

ⓑ 24 and 18



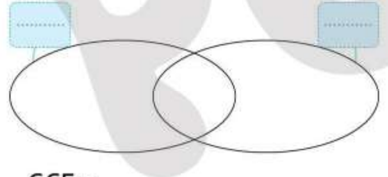
GCF = ...

LCM = ...

24 = ...

18 = ...

ⓒ 4 and 9



GCF = ...

LCM = ...

4 = ...

9 = ...

2 Complete the following table:

	Numbers	Prime Factors	GCF	LCM	Relatively prime Numbers (Yes or No?)
a	6 , 4	6 = ... 4 = ...			
b	15 , 6	15 = ... 6 = ...			
c	8 , 9	8 = ... 9 = ...			
d	12 , 14	12 = ... 14 = ...			
e	18 , 9	18 = ... 9 = ...			
f	6 , 25	6 = ... 25 = ...			

3 Complete using the Venn diagram in each of the following:

a 1 The two numbers represented in the Venn diagram are: ....

and ....

2 The common prime factors of the two numbers are ....

3 The GCF for the two numbers is ....

4 The LCM for the two numbers is ....

5 Are the two numbers relatively prime numbers? (Yes or No)

b 1 The two numbers represented in the Venn diagram are: .... and ....

2 The common prime factors of the two numbers are ....

3 The GCF for the two numbers is ....

4 The LCM for the two numbers is ....

5 Are the two numbers relatively prime numbers? (Yes or No)

c 1 The two numbers represented in the Venn diagram are: .... and ....

2 The common prime factors of the two numbers are ....

3 The GCF for the two numbers is ....

4 The LCM for the two numbers is ....

5 Are the two numbers relatively prime numbers? (Yes or No)

4 Complete the following:

a The prime number has only .... factor(s).

b All prime numbers are odd numbers, except .... is an even number.

c .... is the smallest prime number.

d .... is the smallest odd prime number.

e .... is a number greater than one, and it has two factors only.

f The smallest two-digit prime number is ....

g Prime numbers less than 10 are ....

h The prime factors of 21 are ....

i A number whose prime factors are 3, 3, and 2 is ....

j. Two numbers are relatively prime numbers, if their greatest common factor is ....

k. The least common multiple of the two relatively prime numbers is ....

5 Choose the correct answer:

a. .... is a factor of all numbers. (0 or 1 or 2 or 3)

b. .... is a prime number. (59 or 57 or 52 or 51)

c. 3 and 5 together are prime factors of the number ....
(30 or 53 or 18 or 25)

d. The prime number .... (has no factors or has only one factor or has only two factors or has only three factors)

e. 7, 5, 3 and 2 are .... numbers. (even or odd or prime or others)

f. The prime factors of 12 are ..... . (2×6 or 3×4 or $2 \times 2 \times 3$ or 1×12)

g. If the prime factors of a number are $2 \times 2 \times 2$, then the number is ..... .
(8 or 4 or 6 or 222)

h. The greatest common factor of any two prime numbers is ....
(0 or 1 or their sum or their product)

i. The greatest common factor of two relatively prime numbers is ..... .
(0 or 1 or their sum or their product)

j. The least common multiple of any two prime numbers is ....
(the smallest number or 1 or their sum or their product)

k. The least common multiple of two relatively prime numbers is ..... .
(the smallest number or 1 or their sum or their product)

l. The greatest common factor of the numbers 4 and 15 is ....
(0 or 1 or 4 or 5)

m. 6 and .... are relatively prime numbers. (4 or 15 or 35 or 20)

n. The least common multiple of 9 and 8 is ....(9 or 8 or 1 or 72)

o. The greatest common factor of a number whose prime factors are 2 and 5 and a number whose factors are 3 and 7 is ....
(0 or 10 or 1 or 210)

Assessment on Lesson 2

Unit 1

1 Complete the following:

ⓐ Prime numbers greater than 10 and less than 20 are ....

ⓑ Prime factors of 18 are ....

ⓒ A number whose prime factors are 2, 3, 7 is ....

ⓓ The greatest common factor of any two prime numbers is ....

ⓔ The common multiple of all numbers is ....

2 Choose the correct answer:

ⓐ The greatest common factor of two relatively prime numbers is ....

(0 or 1 or their sum or product)

ⓑ The least common multiple of two relatively prime numbers is ....

(0 or 1 or their sum or their product)

ⓒ The greatest common factor of the numbers 10 and 9 is ....

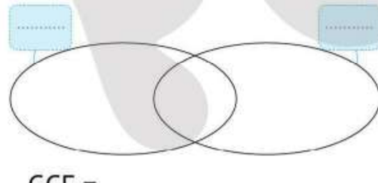
(0 or 1 or 4 or 5)

ⓓ 8 and .... are relatively prime numbers. (4 or 12 or 9 or 6)

ⓔ The two numbers .... are relatively prime numbers.

(2 and 4 or 4 and 6 or 6 and 9 or 9 and 4)

3 The GCF and LCM for the 16 and 12 using a Venn diagram:



GCF = ...

LCM = ...

16 = ...

12 = ...

Lesson 3 Writing Expressions Using the GCF

1 Complete the following:

ⓐ $7 \times (5 + 2) = (\ldots \times \ldots) + (\ldots \times \ldots)$

ⓑ $8 \times (2 + 9) = (\ldots \times \ldots) + (\ldots \times \ldots)$

ⓒ $\ldots \times (\ldots + \ldots) = (8 \times 5) + (8 \times 3)$

ⓓ $\ldots \times (\ldots + \ldots) = (3 \times 3) + (3 \times 7)$

ⓔ $5 \times (\ldots + \ldots) = (\ldots \times 2) + (\ldots \times 4)$

ⓕ $6 \times (\ldots + \ldots) = (\ldots \times 8) + (\ldots \times 7)$

ⓖ $\ldots \times (5 + 1) = (7 \times \ldots) + (7 \times \ldots)$

ⓗ $\ldots \times (4 + 3) = (2 \times \ldots) + (2 \times \ldots)$

2 A merchant has 18 kg of oranges and 27 kg of apples, so if the merchant wants to divide the oranges and apples in bags of the same mass.

ⓐ What is the largest number of bags that can be made for each type of fruit to be.

ⓑ How many kilograms of oranges will each bag contain?

ⓒ How many kilograms of apples will each bag contain?

....

....

....

....

3 **A hospital staffed by 12 doctors and 28 nurses.**

a) Find the greatest number of equal groups that can be made of doctors and nurses together.

b) How many doctors are in each group?

c) How many nurses are in each group?

4 **Mahmoud wanted to divide the 24 pens and 36 notebooks into groups, so that each group contained the same number of tools.**

Write a numerical expression to express is the largest number of groups that can be configured for each type of supply to have for each group?

5 **Nour prepared bags contain snacks. He has 6 oranges and 12 pieces of fruit. Nour wants the snacks in the bags to be distributed evenly without any food left.**

Write a numerical expression to express the number of bags of snacks can Nour prepare?

Assessment on Lesson 3

Unit 1

1 Choose the correct answer:

a) $4 \times (2 + 9) =$ ....

($(4 \times 2) + (4 \times 9)$ or $4 \times 2 + 9$ or $4 \times 2 \times 9$ or $(4 + 2) \times (4 + 9)$)

b) $(6 \times 3) + (6 \times 2) =$ ....

($6 \times 3 \times 2$ or $6 + (3 \times 2)$ or $6 \times (3 + 2)$ or $6 \times 3 \times 6 \times 2$)

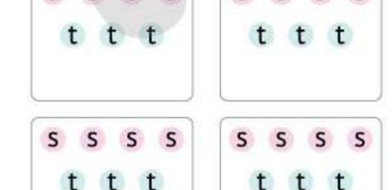
c) .... $\times (5 + 1) = (7 \times 5) + (7 \times 1)$ (5 or 1 or 7 or 6)

d) The GCF for 18 and 12, is .... (6 or 9 or 2 or 3)

e) The common multiple of all numbers is .... (0 or 1 or 2 or 3)

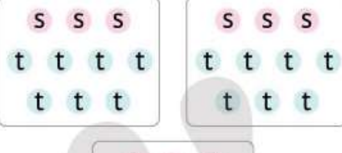
2 Write the number expression for each of the following figures:

a)



.... × (.......... + ...)

b)



s s s
t t t t
t t t

.... × (.......... + ...)

3 Sameh wanted to divide the 21 pens and 35 notebooks into groups, so that each group contained the same number of supplies. Write a numerical expression to express the largest number of sets that can be made for each type of supplies so that each set has the same number?

....

....

....

....

Lesson 4 Analyzing Least Common Multiples

1 **Find the result: (in the simplest form)**

a) $\frac{1}{2} + \frac{2}{3}$ = ...

b) $4\frac{3}{4} + 9\frac{5}{12}$ = ...

c) $\frac{1}{4} + \frac{11}{16}$ = ...

d) $5\frac{7}{10} + 8\frac{3}{4}$ = ...

e) $1\frac{2}{3} + 1\frac{15}{24}$ = ...

f) $\frac{1}{4} - \frac{1}{6}$ = ...

g) $\frac{5}{6} - \frac{1}{9}$ = ...

h) $9\frac{1}{10} - 5\frac{7}{12}$ = ...

i) $5\frac{1}{7} - 2\frac{3}{4}$ = ...

j) $1\frac{2}{3} - 1\frac{3}{5}$ = ...

2 **Nagy bought $3\frac{1}{2}$ kg of oranges and $4\frac{1}{4}$ kg of bananas. What is the total mass of fruit that Nagy bought?**

....

3 **Shimaa bought a pen for $9\frac{1}{2}$ pounds, a ruler for $5\frac{1}{4}$ pounds, and a notebook for 4 pounds. How much did Shimaa pay?**

....

4 **Wael collected $3\frac{3}{4}$ kilograms of dates and gave $2\frac{1}{5}$ kilograms to his friend. How many kilograms are left with Wael?**

....

5 **Hani is studying $4\frac{1}{2}$ hours per day , in which he spends $1\frac{1}{3}$ hours studying mathematics. How much time is left for studying the rest of the subjects?**

6 **Mohammed bought 3 pizzas of the same size and divided each of them in different ways for lunch with his friends. And after the end of the meal, Muhammad noticed that there were some remaining pieces of pizza, which are as follows:**

$\frac{1}{6}$ of the first pizza, $\frac{1}{4}$ of the third pizza, $\frac{1}{3}$ of the last pizza

a. What is the total number of pizzas remaining?

b. How many pizza did Mohamed and his friends eat?

7 **A road of 15 km in length is paved in three stages, with $6\frac{2}{5}$ km in the first stage, $4\frac{1}{2}$ km in the second stage.**

How long is the distance paved in the third stage?

8 **A family bought a set of plastic bags to store strawberries for later use, each bag containing 8 strawberries.**

After a while, the mother opened 5 bags of strawberries for the family members to try some of each, trying to find the bags that contained the best taste.

The bags contained the remaining parts:

$$\frac{1}{8}, \frac{3}{8}, \frac{2}{8}, \frac{1}{8}, \frac{2}{8}$$

a) If the mother wants to repackage the remaining pieces of fruit to form whole packets, how many bags remain?

....

....

b) Since there are 8 strawberries in each of the 5 bags, how many bags did the family eat?

....

....

Assessment on Lesson 4

Unit 1

1 Choose the correct answer:

a) $\frac{3}{5} + \frac{9}{10} =$ .... $(\frac{1}{10}$ or $1\frac{1}{2}$ or $1\frac{1}{5}$ or $\frac{12}{15})$

b) $1\frac{4}{5} + 2\frac{1}{3} =$ .... $(4\frac{2}{15}$ or $3\frac{2}{18}$ or $4\frac{5}{8}$ or $3\frac{5}{8})$

c) $3\frac{1}{2} -$ .... $= 1\frac{3}{8}$ $(2\frac{5}{8}$ or $1\frac{1}{8}$ or $1\frac{5}{8}$ or $2\frac{1}{8})$

d) $3\frac{5}{6} + 1\frac{1}{3} = 4 +$ .... $(2$ or $1\frac{1}{6}$ or $2\frac{2}{6}$ or $4\frac{2}{3})$

2 Complete the following:

a) .... $- 1\frac{2}{3} = 2\frac{1}{2}$

b) $2\frac{1}{2} - 1\frac{7}{8} =$ ....

c) $2\frac{1}{3} + 1\frac{1}{4} =$ ....

3 Answer the following:

a) Hanaa has $15\frac{1}{2}$ pounds, she bought a ruler for $4\frac{1}{2}$ pounds and a pen for $5\frac{1}{2}$ pounds. How much money is left with Hanaa?

....

....

b) You bought a package of dates that contained 16 dates. You had already eaten one when you remembered that you owed your friend half a packet of dates.

1. What fraction represents the number of dates that you have to give to your friend? ....
2. After giving your friend his share, what fraction is the remaining amount of the fruit packet? ....

Assessment 1 on Unit 1



First: Choose the correct answer:

ⓐ 18 is divisible by .... (12 or 7 or 8 or 6)

ⓑ A number is divisible by 5, if its Ones digit is ....

(2 or 5 or 0 or 5 or 2 or 3 or 2 or 0)

ⓒ All .... numbers are divisible by 2.

(odd or even or prime or whole)

ⓓ .... is a factor of all numbers. (0 or 1 or 2 or 3)

ⓔ 7, 5, 3, and 2 are .... numbers. (even or odd or prime or otherwise)

ⓕ The greatest common factor of any two prime numbers is ....

(0 or 1 or their sum or their product)

ⓖ The least common multiple of two prime numbers is ....

(the greatest number or 1 or their sum or their product)

ⓗ $6 \times (7 + 5) =$ ....

($(6 \times 7) + (6 \times 5)$ or $6 \times 7 + 5$ or $6 \times 7 \times 5$ or $(6 + 7) \times (6 + 5)$)

ⓘ $(2 X 8) + (2 X 3) =$ ....

($2 \times 8 \times 3$ or $2 + (8 \times 3)$ or $2 \times (8 + 3)$ or $2 \times 8 \times 2 \times 3$)

ⓙ $1\frac{3}{4} + 2\frac{1}{2} =$ .... ($4\frac{1}{4}$ or $3\frac{1}{4}$ or $3\frac{4}{6}$ or 4)

Second: Complete the following:

ⓐ 21 is a multiple of 7, so .... is divisible by ....

ⓑ 39 is divisible by 3, so .... is a factor of ....

ⓒ The prime number has only .... factor(s).

ⓓ All prime numbers are odd numbers, except .... is an even number.

ⓔ .... is the smallest prime number.

f) Any two numbers are relatively prime numbers if their greatest common factor is ………… .

g) The least common multiple of any two prime numbers is ………… .

h) $8 \times (2 + 7) = (\ldots \times \ldots) + (\ldots \times \ldots)$

i) $3\frac{1}{5} + \ldots\ldots = 5\frac{1}{2}$

Third: Answer the following:

1 Find the result:

a) $5\frac{3}{8} + 2\frac{5}{6} =$ ……………………

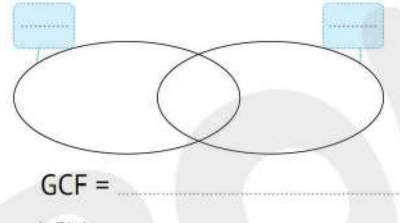
b) $7\frac{1}{4} - 3\frac{3}{5} =$ ……………………

2 Maryam has 25 blue roses and 15 red roses that she wants to distribute in bouquets, so that each bouquet contains the same number of roses of each color. Write numerical expressions using the greatest common factor.

……………………………………………………

……………………………………………………

3 Find the GCF and LCM using Venn diagram for numbers 24 and 16:



GCF = ……………………

LCM = ……………………

24 = ……………………

16 = ……………………

4 Hany has 25 pounds. He bought a piece of cake for $9\frac{1}{2}$ pounds.

How much money is left with Hany?

……………………………………………………

……………………………………………………

Unit 2 Rational Numbers

Concept 2.1 Explore the Number Line

Lessons 1&2 Using a Number Line to Describe Data / Using a Number Line and Symbols to Compare Numbers

1 **Write an integer to represent each of the following:**

a) The temperature is 12°C below zero. (..................)

b) The temperature is 40°C. (..................)

c) Salma dives 10 meters below sea level. (..................)

d) Ahmed withdrew 50 pounds from his savings account. (..................)

e) The height of the tree is 5 meters. (..................)

f) The value of the loss is 20 pounds. (..................)

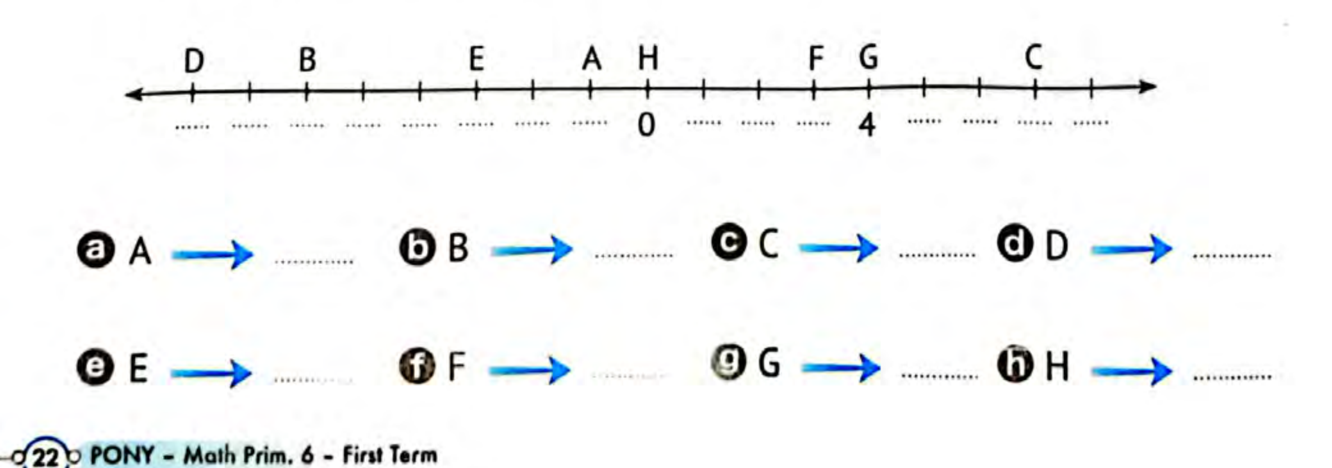
g) The value of the gain is 16 pounds. (..................)

h) The amount of weight gain of 3 kilograms. (..................)

i) Hossam moved three steps back. (..................)

j) Ayman lost 150 pounds. (..................)

2 **Write the numbers represented by the letters shown on the following number line:**



a) A → .... b) B → .... c) C → .... d) D → ....

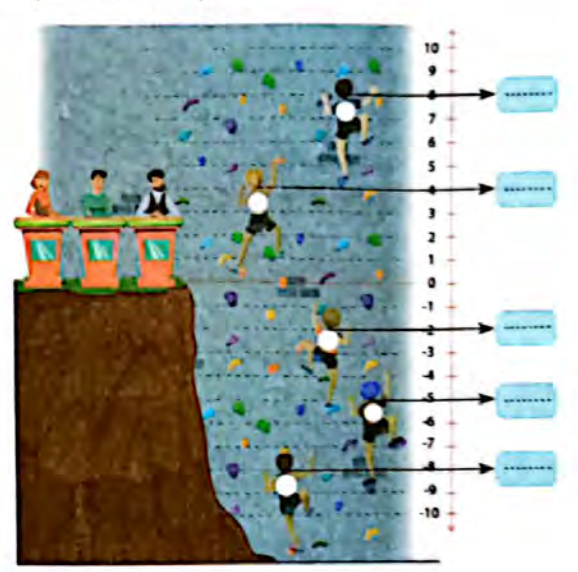
e) E → .... f) F → .... g) G → .... h) H → ....

3 **A group of people go indoor rock climbing together. There is an elevated platform in the middle of the giant rock wall.**

Each climber's location is represented by their distance from the platform.

The following table shows the positions of each of the climbers relative to the platform (the platform location represents 0).

Person	The Position from the Platform in Meters
a	–5
b	4
c	8
d	–8
e	–2



Locate each person on the opposite number line.

4 **Write the next number and the previous number for each of the following numbers:**

The Next Number	....	....	....	....	....
The Number	10	–7	0	–5	9
The Previous Number	....	....	....	....	....

5 **Complete using (< , = or >):**

a –5 ☐ 9 b 2 ☐ 6 c 7 ☐ 3

d –1 ☐ –12 e –5 ☐ –9 f –2 ☐ 4

g 1 ☐ 0 h –6 ☐ 6 i 7 ☐ –7

j 5 ☐ 5 k –3 ☐ –3 l –1 ☐ 0

6 Arrange the following numbers in ascending and descending order:

a 5 , −6 , 8 , −3 , 0

Ascending order: ____ , ____ , ____ , ____ , ____ .

Descending order: ____ , ____ , ____ , ____ , ____ .

b 120 , −350 , −5 , 63 , 45

Ascending order: ____ , ____ , ____ , ____ , ____ .

Descending order: ____ , ____ , ____ , ____ , ____ .

c −1 , 1 , 0 , −3 , 3

Ascending order: ____ , ____ , ____ , ____ , ____ .

Descending order: ____ , ____ , ____ , ____ , ____ .

7 Write the opposite of each of the following numbers:

a −9 → .... **b** −3 → .... **c** −12 → ....

d 7 → .... **e** 8 → .... **f** 25 → ....

g 0 → .... **h** −1 → .... **i** 1 → ....

8 Complete the following:

a The integer that expresses "the temperature is 15 below zero" is ....

b The integer that expresses "the height of the school building is 25 meters" is ....

c The next number to −5 is ....

d The number that comes before 0 is ....

e The number "−12" is the opposite of the number ....

f) The opposite of "10" is ....

g) The smallest number in counting numbers is ....

h) The smallest positive integer is ....

i) The smallest non-negative integer is ....

j) The number and its opposite is on .... from zero, but on two .... sides on the number line.

9 Choose the correct answer from the brackets:

a) –3 is located to the right of the number .... on the number line.
(–4 or 4 or –2 or 2)

b) The number that comes just before .... is –1. (–2 or 2 or 0 or 1)

c) –9 > .... (–15 or 8 or –8 or 10)

d) The opposite of –12 is .... (–12 or 12 or 1 or 2)

e) The number .... is neither a positive nor a negative number.
(0 or 1 or –1 or 10)

f) The opposite of 5 > .... (–4 or 4 or –6 or 6)

g) The largest negative integer is .... (–1 or 1 or –100 or 0)

h) The largest non-positive integer is .... (–1 or 1 or –100 or 0)

i) All negative numbers are .... zero.
(greater than or less than or equal to)

j) All positive numbers are .... zero.
(greater than or less than or equal to)

Assessment 1 on Lessons 1&2

Unit 2

1 Choose the correct answer:

a) The integer that expresses (the depth of a well of 5 meters) is .... (–5 or 5 or –10 or 10)

b) An integer between the numbers 2 and –2 is .... (–1 or –3 or 3 or –4)

c) The number that comes just after –9 is .... (–10 or –8 or 10 or 8)

d) –25 ☐ –12 (> or = or <)

e) 6 < .... (–8 or 8 or –9 or –7)

2 Complete the following:

a) The integer that expresses "move forward 6 steps" is ....

b) Integers between –3 and 2 are ....

c) The additive inverse of 8 is ....

d) The smallest positive integer is ....

e) –5 , –4 , –3 , –2 , ... , ... , ... , ...

3 Arrange the following integers in an ascending order:

–3 , 9 , –32 , 0 , 2

.... , ... , ... , ... , ...

4 Locate each of the following points on the number line:

Point	A	B	C	D	E
Number	0	3	–2	5	–3

0

Concept 2.2 Investigate Rational Numbers

Lessons 3&4 Analyzing Rational Numbers by Using Models / Comparing and Ordering Rational Numbers

1 Classify all the following numbers according to the number groups shown (put a tick ✓):

	Number	Counting Numbers	Natural Numbers	Integers	Rational Numbers
a	3				
b	–7				
c	0				
d	–7.9				
e	$\frac{3}{5}$				
f	$-\frac{4}{8}$				
g	5				
h	–0.9				
i	$3\frac{2}{5}$				
j	–4				

2 Put the following numbers in the appropriate places on the number line:

-3 , 1.5 , $-\frac{3}{8}$, $-6\frac{1}{4}$, $4\frac{2}{3}$, 7.2

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

Theme 1

3 Write each of the following numbers in fraction form $\frac{a}{b}$, then write its additive inverse:

Number	2.5	−0.8	5	$-3\frac{1}{2}$	$2\frac{3}{4}$
Fraction Form $\frac{a}{b}$	....	....	....	....	....
Additive Inverse	....	....	....	....	....

4 Complete using (<, = or >):

a) $\frac{2}{5}$ ☐ $\frac{3}{5}$　　b) $-\frac{6}{7}$ ☐ $\frac{7}{7}$　　c) $-\frac{5}{9}$ ☐ $\frac{8}{9}$

d) $\frac{3}{8}$ ☐ $\frac{3}{5}$　　e) $-\frac{2}{5}$ ☐ $\frac{2}{3}$　　f) $-\frac{4}{5}$ ☐ $\frac{4}{7}$

g) $\frac{2}{7}$ ☐ $\frac{1}{3}$　　h) $\frac{3}{4}$ ☐ $-\frac{4}{5}$　　i) $-\frac{2}{7}$ ☐ $-\frac{3}{4}$

j) 0.5 ☐ $\frac{1}{2}$　　k) 2.4 ☐ $\frac{24}{100}$　　l) $-2\frac{1}{3}$ ☐ 0

5 Arrange each of the following groups of numbers in ascending and descending order:

a) $2\frac{2}{3}$, −5.5 , $7\frac{1}{4}$, 3.7 , $-1\frac{3}{5}$

Ascending order: .... , ... , ... , ... , ...

Descending order: .... , ... , ... , ... , ...

b) $\frac{1}{2}$, $\frac{2}{3}$, −0.82 , 0.25 , $-\frac{1}{2}$

Ascending order: .... , ... , ... , ... , ...

Descending order: .... , ... , ... , ... , ...

c $-5\frac{1}{5}$, 2.2 , $-5\frac{1}{4}$, −5.5 , $2\frac{3}{4}$

Ascending order: .... , ... , ... , ... , ...

Descending order: .... , ... , ... , ... , ...

6 Choose the correct answer from the brackets:

a The number (−2.5) is a/an ....

(counting number or natural number or integer or rational number)

b The number (5) is not a/an ....

(counting number or natural number or integer or even number)

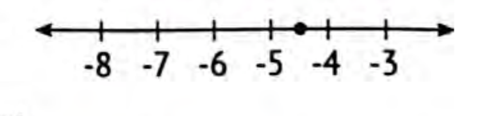
c The number (0) is a/an ....

(counting number or natural number or negative integer or odd number)

d The opposite of $-\frac{3}{4}$ is .... ($1\frac{1}{3}$ or $\frac{4}{3}$ or $-\frac{4}{3}$ or $\frac{3}{4}$)

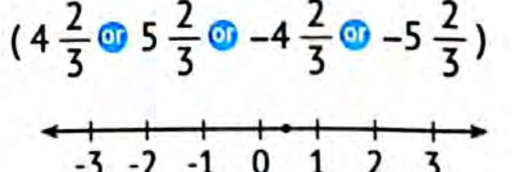
e −6 in $\frac{a}{b}$ form is .... ($\frac{6}{1}$ or $\frac{1}{6}$ or $-\frac{6}{1}$ or $-\frac{1}{6}$)

f The rational number represented on the corresponding number line is ....



($4\frac{2}{3}$ or $5\frac{2}{3}$ or $-4\frac{2}{3}$ or $-5\frac{2}{3}$)

g The rational number represented on the corresponding number line is .... (− 1.5 or −0.5 or 1.5 or 0.5)



h The additive inverse of $\frac{3}{5}$ .... $-\frac{5}{3}$ (> or = or <)

i $-\frac{7}{4}$ > .... ($-\frac{8}{4}$ or $\frac{8}{4}$ or $-1\frac{3}{4}$ or $\frac{7}{4}$)

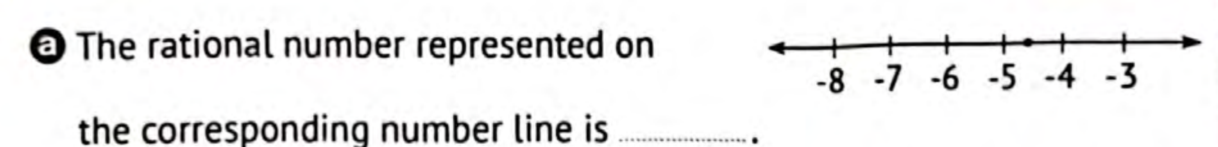
j $\frac{2}{3}$ < .... ($\frac{2}{3}$ or $-1\frac{2}{3}$ or $-\frac{3}{2}$ or $\frac{3}{2}$)

Assessment 2 on Lessons 3&4

Unit 2

1 Choose the correct answer:

ⓐ The rational number represented on the corresponding number line is ....



($4\frac{1}{2}$ or $5\frac{1}{2}$ or $-5\frac{1}{2}$ or $-4\frac{1}{2}$)

ⓑ –2 is a / an ....

(counting number or natural number or negative integer or odd number)

ⓒ All integers are .... numbers.

(counting or natural or even or rational)

ⓓ The additive inverse of - 5 is .... (5 or –5 or $-\frac{1}{5}$ or $\frac{1}{5}$)

ⓔ $-2\frac{3}{4}$ is between the two whole numbers ....

(2,3 or 1,2 or –2, – 3 or –1, –2)

2 Complete each of the following:

ⓐ The additive inverse of 5.9 is ....

ⓑ The rational number –5.6 lies between the two whole numbers .... and .... on the number line.

ⓒ All natural numbers are .... numbers and .... numbers.

ⓓ –2.5 in the form $\frac{a}{b}$ is .... (In its simplest form)

ⓔ $-\frac{7}{4}$ in the decimal form is ....

3 Arrange the following numbers in a descending order:

7.7 , 7 , –3.8 , $7\frac{1}{2}$, $-3\frac{1}{5}$

.... , ... , ... , ... , ...

Concept 2.3 Interpret and Use Absolute Value

Lessons 5&6 Exploring Absolute Value / Comparing Absolute Values

1 Find the value of each of the following:

a) $|-5|$ = ... b) $|-15|$ = ... c) $|6|$ = ...

d) $|45|$ = ... e) $|\frac{7}{9}|$ = ... f) $|7\frac{3}{5}|$ = ...

g) $|-\frac{3}{4}|$ = ... h) $|-7\frac{2}{3}|$ = ... i) $|0.03|$ = ...

j) $|-0.7|$ = ... k) $|7.04|$ = ... l) $|-6.5|$ = ...

2 Complete using (< , = or >):

a) -0.7 ☐ $|-0.7|$ b) $|-9|$ ☐ $|-8|$

c) 5.07 ☐ $|-5.07|$ d) $|3.4|$ ☐ $|-3.4|$

e) $|1.8|$ ☐ 1.8 f) $|-8.2|$ ☐ -7.9

g) $|-2.71|$ ☐ 2.7 h) $|-75|$ ☐ 64

i) $|\frac{2}{3}|$ ☐ $|-\frac{1}{3}|$ j) $-\frac{7}{8}$ ☐ $|-\frac{7}{9}|$

k) $|3\frac{1}{4}|$ ☐ $|-7\frac{2}{5}|$ l) $4\frac{3}{4}$ ☐ $|2\frac{2}{3}|$

l) $|-\frac{8}{3}|$ ☐ $|2\frac{2}{3}|$ m) $-3\frac{4}{5}$ ☐ $|-\frac{3}{2}|$

n) $|-3|$ ☐ -3 o) $-|\frac{3}{4}|$ ☐ $|-\frac{3}{4}|$

3 **Arrange each group of the following numbers in ascending and then descending order:**

a 8 , -17 , $|-3|$, -9 , $|12|$

Ascending order: .... , ... , ... , ... , ...

Descending order: .... , ... , ... , ... , ...

b 7.3 , -2.7 , $|6.7|$, -4.8 , $|-1.5|$

Ascending order: .... , ... , ... , ... , ...

Descending order: .... , ... , ... , ... , ...

c $\frac{3}{4}$, $-\frac{5}{8}$, $|-\frac{1}{2}|$, $-\frac{3}{4}$, $|\frac{1}{4}|$

Ascending order: .... , ... , ... , ... , ...

Descending order: .... , ... , ... , ... , ...

4 **Complete the following:**

a If $5 = |a|$, then a = ... or ....

b If $b = |-7|$, then b = ...

c If $n = |9|$, then n = ...

d $-|5|$ = ...

e $-|-4|$ = ...

f $|9| + |-9|$ = ...

g If the temperature recorded in Moscow is -6 and the temperature recorded in Cairo is 4, then the temperature of .... is lower because -6 .... 4.

h If the height of mountain (A) above sea level is 1,200 m, and the height of mountain (B) above sea level is 1,400 m, then the mountain .... lies at a distance closer to sea level.

i Which is bigger -7.22 or -7.2? ....

5

Tariq
Fouad
Wael
Muhammad
Tamer
Sameh

-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

On sports day, a group of children stood in one line to throw the ball towards a line parallel to them. And the rules of the game dictate that the winner is the one who throws the ball to the nearest distance from the red line (before or after it), and a number line was drawn to know the distance at which the ball stops.

The results for the students were as shown

Child	Sameh	Tamer	Muhammad	Wael	Fouad	Tariq
Distance	3	−4	−2	−3	1	5

a Complete the following:

1. The children who throw the ball before the line are ....
2. The children who throw the ball after the line are ....
3. The child whose ball has reached the closest distance from the line is .... (the winner).
4. The child whose ball has reached the farthest distance from the line is ....

b Arrange the children according to the distance their ball has reached from the least to the greatest:

.... , ... , ... , ... , ... , ...

Assessment 3 on Lessons 5&6

Unit 2

1 Choose the correct answer:

a) $|-1.5| =$ .... (1.5 or −1.5 or 15 or −15)

b) $|6| =$ .... (6 , or −6 or 3 or −3)

c) The absolute value of 2.7 is.......... . (−2.7 or 2.7 or 27 or −27)

d) The absolute value of "zero" is .... (10 or 0 or −1 or 1)

e) The larger the absolute value, the .... zero.

(closer number to or farther number to or equal number to)

2 Complete the following:

a) If $5 = |m|$, then m = ... or ....

b) If $k = |-3.5|$, then k = ...

c) If $k = |9|$, then k = ...

d) Opposite numbers on a number line have the .... absolute values.

e) .... is closer to the number zero. (−2.5 or 0.7)

3 Arrange the following numbers in a descending order:

$$0.75 \ , \ -\frac{1}{8} \ , \ \left|-\frac{1}{2}\right| \ , \ -\frac{1}{4} \ , \ |0.25|$$

.... , ... , ... , ... , ...

4 Complete using (< , = or >):

a) -0.9 ☐ $|-0.9|$

b) $|-1.5|$ ☐ -1.5

c) $\left|3\frac{1}{4}\right|$ ☐ $\left|-4\frac{1}{3}\right|$

d) $-\frac{2}{5}$ ☐ $\left|-\frac{1}{2}\right|$

Concept 3.1 Use and Analyze Expressions

Lessons 1&2 Creating Mathematical Expressions / Analyzing Mathematical Expressions

1 Complete the following table:

	Algebraic Term	Number of Factors	Coefficient	Algebraic Factors
a	$-3ab$	3	-3	a , b
b	$5x$			
c	$-3y$			
d	$\frac{1}{5} \times y$			
e	$-\frac{2}{8}m$			
f	$8abc$			
g	$7r$			
h	$5 \times yz$			
i	$6n$			
j	$\frac{3}{7}km$			
k	$23ab$			
l	$\frac{1}{6}yz$			

2 Classify the following mathematical expressions into (numerical expressions or algebraic expressions) Put a tick (✓):

	Mathematical Expression	Numerical Expression	Algebraic Expression
a	$7(1.4 + 3.2)$		
b	$2 + 7.8$		
c	$3q + 4p$		
d	$3(6) + 2$		
e	$2n$		
f	$\frac{1}{4}m - 2$		
g	$5x + 3x - 1$		
h	$r + s - t$		
i	$4.5 + 56 + 2$		
j	$5 + 3$		
k	$5m + 3a - 2$		
l	$4 \times y + 3x$		
m	$7.5 + 3.5$		
n	$5 \times 3 + 4 \times 3$		
o	$x - 2 + 3$		
p	$q + 4$		

3 Complete the following table:

	Mathematical Expression	Variable	Absolute Term	Coefficients
a	5 a + 8			
b	9 x – 5			
c	3 a + 4 b + 7			
d	6 x + 15 + 2.5			
e	5 y + 63			
f	8 r + 1.3 + 7			
g	0.2 m + 12 – 0.3 h – 5			
h	3 p + 15 c + 4 + 2			
i	6 w + 2 + 3 + 0.2			
j	2.5 q + 7 + 3 + 2.4			

4 Complete the following table:

	Mathematical Expression	Number of Terms	Like Terms
a	9		
b	3.9		
c	5a		
d	7 m		
e	3 x + 7 x		
f	8 a + 5 a		
g	2 y + 7		
h	15 + 3 + x + y		
i	$36 + \frac{1}{2}$ a + 12 + a		
j	3 b + 5 b + 5 + 2 b		



Theme 1

5 Write a mathematical expression for each of the following situations:

a) Two numbers whose sum is 12, one of them is "d" so the other number is (............)

b) Ahmed's age exceeds his brother Essam's by three years, so if Essam's age is "x" years then Ahmed's age is (............)

c) If Ramez has $\frac{1}{5}$ of Emad has and if Emad has "w" pounds, then what Ramez has is (............)

d) If Hani has "x" pounds and he takes 10 pounds from his father, then Hani now has .... pounds.

6 Choose the correct answer:

a) The algebraic term "$\frac{1}{5}x$" consists of ...... a factor. (1 or 2 or 3 or 4)

b) In the algebraic term "$-3 \times y$", the coefficient is ......

(y or x or 3 or −3)

c) In the algebraic term "$\frac{3}{8}$ a", the algebraic factor is ......

(a or 8 or 3 or $\frac{3}{8}$)

d) The number of terms that make up the algebraic expression "$5x + 3y + 2$" is ...... (2 or 3 or 5 or 6)

e) The number of terms that make up the algebraic expression "$8 + 3 \times y$" is ...... (2 or 3 or 4 or 5)

f Like terms for the algebraic expression "5 + 5y + 2y" are ....

(5 , 5 y or 5 y , 2 y or 5 , 2 y or 5 , 5y , 2y)

g Like terms for the algebraic expression "2 + 3 b + 2 a" are ....

(2 , 3 b or 2 , 2 a or 3 b + 2 a or none)

h In the algebraic expression "3 y + 9", the constant is ....

(9 or 3 or y or 3 y)

i In the algebraic expression "5 a + 3 b + 2 + 4", the coefficients are ....

(2 , 4 or 5 , 3 or a , b or 5 , 3 , 2 , 4)

j If the height of the school building is "m" meters and the height of the tree adjacent to this building 10 meters less than it, then height of the tree is .... meters.

(m + 10 or m – 10 or 10 m or $\frac{m}{10}$)



Assessment 1 on Lessons 1&2

Unit 3

1 Complete following:

ⓐ The algebraic factor in the term " $2.5\,x$ " is ....

ⓑ The coefficient in the algebraic term $3 \times y$ is ....

ⓒ The number of terms in the algebraic expression $3 \times y - 25$ is ....

ⓓ Like terms in the algebraic expression $6\,x + 6\,y + 2\,x + 6$ are ....

ⓔ The constant in the algebraic expression $5\,b + 3.2$ is ....

2 Choose the correct answer:

ⓐ Like terms in the algebraic expression $2\,a + 3\,a\,b + 3$ are ....

(2 a , 3 a b or 3 a b , 3 or 2 a , 3 or none)

ⓑ The coefficients in the algebraic expression "$5\,a + 3\,b + 8 - 2.5$" are ....

(5 , 3 or 8 , 2.5 or 5 a , 3 b or 5 , 3 , 8 , 2.5)

ⓒ Ahmed and Tamer have 60 pounds, if what Ahmed has is x pounds, then what Tamer has is .... pounds. ($60 + x$ or $60 - x$ or $60\,x$ or $60 \div x$)

ⓓ The number of terms of the algebraic expression $2.5\,x + 2\,x\,y - 4$ is.... .

(3 or 4 or 5 or 6)

ⓔ Constants in the algebraic expression: $5\,a + \frac{2}{3} - 2\,b + 4$ are ....

(5 , 2 or $\frac{2}{3}$, 4 or 5 , $\frac{2}{3}$ or 2 , 4)

3 Complete using the mathematical expression "$5\,x + 2y + 6\,x + 3$":

ⓐ The number of terms of a mathematical expression is ....

ⓑ Like terms are ....

ⓒ Coefficients are ....

ⓓ Constants are ....

Lesson 3 Writing Algebraic Expressions

1 **Express each of the following verbal forms using algebraic expressions:**

- a) Adding "z" to 36 (..............................)
- b) 5 less than "x" (..............................)
- c) 9 more than "a" (..............................)
- d) Three times of "b" (..............................)
- e) Product of "p" and 7.5 (..............................)
- f) Subtract 14 from "y" (..............................)
- g) Divide "h" by 6 (..............................)
- h) 9 divided by "r" (..............................)
- i) "a" increased by 3.5 (..............................)
- j) The sum of half "q" and 4 (..............................)
- k) 7 subtracted from twice "w" (..............................)
- l) Double of "v" minus 3 (..............................)
- m) Twice the sum of "g" and 6 (..............................)
- n) Three times the difference between "s" and 2 (..............................)
- o) The sum of three times "a" and 5 (..............................)
- p) Ammar has "x" coins, Tamer has 7 more than Ammar. (..............................)
- q) Baher has "m" stickers in the sticker book and then puts up 12 more stickers. (..............................)
- r) A student shared an orange equally with 2 of his friends. (..............................)

Theme 1

2 Write each of these algebraic expressions using the verbal form:

ⓐ a + 9 : ....

ⓑ b – 6 : ....

ⓒ 7.5 – f : ....

ⓓ 12 y : ....

ⓔ 8 ÷ s : ....

ⓕ K ÷ r : ....

ⓖ $3x + 6$: ....

ⓗ $7 - 2x$: ....

ⓘ $\frac{1}{2}(m + 3)$: ....

ⓙ 5 (c – 3): ....

3 Choose the correct answer:

ⓐ If we subtract 5 from the number "x", the result is ....

($x + 5$ or $x - 5$ or $5 - x$ or $5x$)

ⓑ Ziyad saved "x" pounds and his father gave him 10 pounds, so that he would have ....

($x - 10$ or $x + 10$ or $10x$ or $10 - x$)

ⓒ The algebraic expression representing (subtract 3 from twice the number "x") is ....

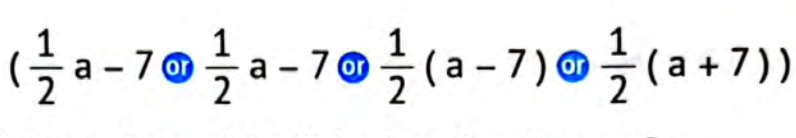
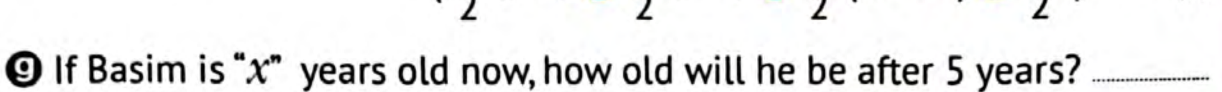
($x - 3$ or $2x - 3$ or $3x + 2$ or $5x$)

ⓓ The algebraic expression representing (the difference between three times the number "y") and 2 = ... ($3y - 2$ or $2y - 3$ or $3 \times 2x$ or $\frac{3x}{2}$)

ⓔ The algebraic expression that represents (three times the sum of the number "m") and 12 is ....

($3m + 12$ or $3(m + 12)$ or $12m + 3$ or $12(m + 3)$)

f The algebraic expression representing (half the difference between the number "a" and 7) is …… .

$(\frac{1}{2}a - 7$ or $\frac{1}{2}a - 7$ or $\frac{1}{2}(a - 7)$ or $\frac{1}{2}(a + 7))$

g If Basim is "x" years old now, how old will he be after 5 years? ……

$(x - 5$ or $x + 5$ or $5 \div x$, or $5x)$

h Which of the following operations expresses the mathematical expression (double the number plus 4) ……

$(+, -$ or $\times, -$ or $\times, +$ or $\times, \div)$

4 **Match each verbal expression with the appropriate algebraic expression:**

a Twice the sum of "a" and 4 •	• $2a + 4$ **1**
b The sum of twice of "a" and 4 •	• $4a$ **2**
c The sum of "a" and 4 •	• $2(a + 4)$ **3**
d Product of "a" by 4 •	• $a + 4$ **4**

Assessment 2 on Lesson 3

Unit 3

1 Complete the following:

ⓐ The verbal form for the algebraic expression $\frac{a}{5} + 3$ is

....

ⓑ The verbal form for the algebraic expression 6 m is

....

ⓒ The value that expresses the verbal form "three times b" is ....

ⓓ Ahmed is now "y" years old. How old was he 3 years ago? ....

ⓔ Ahmed shared a pizza pie equally with 4 of his friends, each of whom had their share of the pizza is (..............................).

2 Choose the correct answer:

ⓐ The number "m" plus 18 and the result divided by 3 = ...

($3 \div (m + 18)$ or $(m + 18) \div 3$ or $\frac{m}{3} + 18$ or $m + \frac{18}{3}$)

ⓑ If "b" is an integer, then the integer immediately next to it is ....

($b + 1$ or $b - 1$ or $2b$ or $\frac{b}{2}$)

ⓒ A square of side length "s" cm has a perimeter of .... cm

($s + 4$ or $s - 4$ or $\frac{s}{4}$ or $4s$)

ⓓ Two numbers whose sum is 35 and one of them is "w", then the other number is ....

($w + 35$ or $w - 35$ or $35 - w$ or $35w$)

ⓔ The price of a kilogram of meat increased by 120 pounds. If its price becomes "x" after the increase, then its price before the increment is ......

($x + 120$ or $x - 120$ or $12 - x$ or $120x$)

3 Bassem runs one kilometer in 15 minutes.

Write a mathematical expression that expresses the number of kilometers that Bassem runs in "t" minutes.

....

Concept 3.2 Algebraic Expressions and Exponents

Lessons 4 Ordering of Operations and Exponents

1 Complete the following:

a) $5 \times 5 \times 5 \times 5 = 5^{\dots}$

b) $4 \times 4 \times 4 = 4^{\dots}$

c) $3 \times 3 \times 3 \times 3 \times 3 = \dots^{5}$

d) $8 \times 8 \times 8 = \dots^{3}$

e) $2 \times 2 \times 2 \times 2 = \dots^{\dots}$

f) $6 \times 6 \times 6 = \dots^{\dots}$

g) $7^2 = \dots \times \dots$

h) $6^4 = \dots \times \dots \times \dots \times \dots$

i) $10^2 = \dots \times \dots$

j) $1^5 = \dots \times \dots \times \dots \times \dots \times \dots$

k) $5^3 = \dots \times \dots \times \dots$

l) $2^2 = \dots \times \dots$

2 Find the value:

a) $5^2 = \dots$

b) $3^3 = \dots$

c) $2^5 = \dots$

d) $1^4 = \dots$

e) $1^3 = \dots$

f) $10^3 = \dots$

g) $0^2 = \dots$

h) $0^3 = \dots$

i) $1^8 = \dots$

j) $1^{10} = \dots$

k) $6^0 = \dots$

l) $9^0 = \dots$

3 Follow the order of performing operations, then find the value of each of the following:

a) $4 + 5 \times 6$ = ... = ...	b) $18 - 12 \div 3$ = ... = ...	c) $15 \div 3 + 7$ = ... = ...
d) $7 \times 7 - 24$ = ... = ...	e) $9 + 9 - 8$ = ... = ...	f) $15 - 3 + 7$ = ... = ...
f) $6 \times 6 + 4$ = ... = ...	g) $48 \div 8 \times 2$ = ... = ...	h) $5 \times 2 + 3 \times 4$ = ... = ...

4 **Follow the order of performing operations, then find the value of each of the following:**

a $(3 + 6) \times 2$ = ... = ...	b $15 \div (2 + 3)$ = ... = ...	c $8 \times (12 \div 4)$ = ... = ...
d $[3 \times (9 - 4)] - 10$ = ... = ...	e $5 \times [12 \div (4 + 2)]$ = ... = ...	

5 **Follow the order of performing operations, then find the value of each of the following:**

a $4^2 + 2 \times 3$ = ... = ...	b $2^4 - 3^2$ = ... = ...	c $10^2 \div 5$ = ... = ...
d $45 - 6^2$ = ... = ...	e 3×1^3 = ... = ...	f $48 \div 4^2$ = ... = ...
g $3 \times 2^3 \div 12$ = ... = ... = ...	h $8 + 5^2 - 30$ = ... = ... = ...	i $2 \times 10^2 + 15$ = ... = ... = ...
j $2^2 \times 3 - 10$ = ... = ... = ...	k $6^2 \div 9 + 5$ = ... = ... = ...	l $4^3 + 2 \times 5$ = ... = ... = ...

6 Follow the order of performing operations, then find the value of each of the following:

a $4^2 + (15 - 7) \times 2$

= ....

= ....

= ....

b $(2^5 + 3) \div (2^3 - 1)$

= ....

= ....

= ....

c $3 \times [5^2 - (4 \times 6)]$

= ....

= ....

= ....

d $[5^2 \times (6^2 \div 9)] - 24$

= ....

= ....

= ....

7 Choose the correct answer:

a 4^2 = ... (4×2 or 4×4 or $4 + 2$ or $4 + 4$)

b 3^0 = ... (3 or 0 or 1 or 3×0)

c 1^5 = ... (1×5 or $1 + 5$ or 1 or 0)

d $2 \times 2 \times 2 \times 2 \times 2$ = ... (2^5 or 5^2 or 2×5 or $2 + 5$)

e $5 \times 5 \times 5$ = ... (3^5 or 5^3 or $5 + 3$ or 5×3)

f $4^{\dots} = 1$ (0 or 1 or 2 or 5)

g $5^{\dots} = 5$ (0 or 1 or 2 or 5)

h 3^4 = ... ($4 \times 4 \times 4$ or $3 \times 3 \times 3 \times 3$ or 3×4 or $3 + 4$)

i 2^4 ☐ 4^2 (< or = or > or ≥)

j 3^2 ☐ 2^3 (< or = or > or ≥)

k) $5 \times 3 + 2^2 =$ .... (35 or 19 or 51 or 17)

l) $2^3 \times (5^2 + 75) =$ .... (800 or 275 or 210 or 135)

m) $3^2 + 3^2 + 3^2 =$ .... (3^6 or 9^2 or 3^3 or 9^6)

8 Complete the following:

a) In 5^7 : 5 is called .... and 7 is called ....

b) In 3^8 : 3 is called .... and 8 is called ....

c) In .... : 4 is called the base and 2 is called the exponent.

d) In .... : 8 is called the base and 3 is called the exponent.

e) Six cubed = ...

f) Seven squared = ...

g) Four to the power 5 = ...

h) .... to the power .... $= 6^4$

i) If $3^x = 81$, then the value of x is ....

j) If $y^3 = 64$, then the value of y is ....

Assessment 3 on Lessons 4

Unit 3

1 Choose the correct answer:

a) $3^2 =$ .... (3 + 3 or 2 + 2 + 2 or 3 × 3 or 3 × 2)

b) $3^{\cdots} = 3$ (0 or 1 or 3 or 10)

c) 4^2 ☐ 2^4 (< or = or > or ≤)

d) $5^2 + 2^2 \times 10^2 =$ .... (425 or 2,900 or 129 or 410)

e) $(3^3 - 3^2) \div 3^2 =$ .... (26 or 9 or 0.5 or 2)

2 Complete the following:

a) $5^{\cdots} = 1$

b) $7^{\cdots} = 7$

c) $2^{\cdots} = 8$

d) $3 \times 3 \times 3 \times 3 \times 3 = 3^{\cdots}$

e) $6^2 \div 3^2 \times 2 =$ ....

3 Follow the order of performing operations, then find the value of each of the following:

a) $(15 - 9) + 3 \times 4^2 \div 2$

= ....

= ....

= ....

b) $8 + 2 \times (6 - 2) \div 2^3$

= ....

= ....

= ....

c) $[3^2 \times (8 - 5)] \div 3$

= ....

= ....

= ....

d) $5^2 + (48 \div 2^3) - 15$

= ....

= ....

= ....

Lessons 5-7 Evaluating Algebraic Expressions
Applications on Algebraic Expressions
Determining Equivalent Algebraic Expressions

1 **Write the algebraic expression that represents each of the following situations:**

a If the price of one pen is 8 pounds, what is the price of "x" pens?

(..........................)

b If the price of a juice can is 12 pounds, what is the price of "y" juice cans?

(..........................)

c Salah saves "z" pounds per day. How much does he save in a week?

(..........................)

d A restaurant provides meals, the price of one meal is 50 pounds, and 15 pounds are added to the home delivery service, regardless of the number of meals required.

What is the total amount paid when ordering "m" meals?

(..........................)

e Hussam is training for n hours daily for 6 days of the week, and on Friday he is training for 3 hours. How many hours does Hossam spend training in one week? ....

f Wafaa has 300 pounds. She bought 9 pens of the same type. The price of one pen is "p" pounds. What is the amount left with Wafaa after buying the pens? ....

g Hana has 3 boxes of pens, each with "q" pens, and she wants to divide these pens among 6 children.

How many pens will each child get? ....

2 Find the value of the algebraic expression in each of the following:

a $6x + 15$ [If $x = 3$]

= ____________

= ____________

= ____________

b $25 - 3y$ [If $y = 8$]

= ____________

= ____________

= ____________

c $9z - 15$ [If $z = 2.1$]

= ____________

= ____________

= ____________

d $4a - 15 \div 3$ [If $a = 2.5$]

= ____________

= ____________

= ____________

e $(6b - 3) \div 7$ [If $b = 4$]

= ____________

= ____________

= ____________

f $18 \div (9 - 2c)$ [If $c = 1.5$]

= ____________

= ____________

= ____________

3 Find the value of the algebraic expression in each of the following:

a $d^3 + 7$ [If $d = 3$]

= ____________

= ____________

= ____________

b $37 - 4^e$ [If $e = 2$]

= ____________

= ____________

= ____________

c $f^5 - 21$ [If $f = 2$]

= ____________

= ____________

= ____________

d $g^2 - 32 \div 8$ [If $g = 5$]

= ____________

= ____________

= ____________



e $(h^2 - 1) \div 5$ [If h = 6]

= ....

= ....

= ....

f $16 \div (20 - n^2)$ [If c = 4]

= ....

= ....

= ....

g $m^2 + m^3 - 15$ [If m = 3]

= ....

= ....

= ....

h $k^2 \times (k - 5)$ [If k = 5]

= ....

= ....

= ....

4 Find the value of the algebraic expression in each of the following:

a $15 + 3x - x^2$ [If x = 4]

= ....

= ....

= ....

b $y^3 - 5y \div 3$ [y = 3]

= ....

= ....

= ....

c $6a \div (a^2 - 10)$ [If a = 5]

= ....

= ....

= ....

d $3b + 6 \times (b^2 - 3)$ [If b = 2]

= ....

= ....

= ....

5 In a car park, 10 pounds is collected for parking the car for the first hour, and 5 pounds are added for every hour after the first hour.

a Write an algebraic expression that expresses the amount collected for parking the car for "h" hours after the first hour. (..........)

b If the number of hours the car waited for is 6 hours, what is the value of the amount collected for parking the car? ....

6 **Hala receives a daily wage of "p" pounds. If her expenses in 10 days amounted to 325 pounds.**

a Write an algebraic expression for the amount remaining with her in the 10 days. (..............................)

b If Hala's wages are 50 Egyptian pounds per day, how much money is left with her? ....

7 **Evaluate each of these algebraic expressions using two positive integers of your choice. If the algebraic expressions are equal, answer yes. If algebraic expressions are not equal, answer no.**

a	$x + 3x$	$3(x + 1)$	Equal or Not?
If x = ...			
If x = ...			

From the previous table, we find that: The two algebraic expressions are .... (equivalent or not equivalent).

b	$5x + 5$	$5(x + 1)$	Equal or Not?
If x = ...			
If x = ...			

From the previous table, we find that: The two algebraic expressions are .... (equivalent or not equivalent).

c	$8x - 4$	$4x + 3 + 4x + 1$	Equal or Not?
If x = ...			
If x = ...			

From the previous table, we find that: The two algebraic expressions are .... (equivalent or not equivalent).

d	$2x + 3x + 10$	$5(x + 2)$	Equal or Not?
If x = ...			
If x = ...			

From the previous table, we find that: The two algebraic expressions are .... (equivalent or not equivalent)

e	$9(x + 6)$	$9x + 6$	Equal or Not?
If x = ...			
If x = ...			

From the previous table, we find that: The two algebraic expressions are .... (equivalent or not equivalent)

Assessment 4 on Lessons 5-7

1 Choose the correct answer:

ⓐ If the price of one shirt is 120 Egyptian pounds, then the price of "m" number of shirts is ....

(120 m or 120 ÷ m or 120 + m or 120 – m)

ⓑ If Hanan saves "d" pound daily for 5 days, then her father gives her 20 pounds, then the amount that Hanan has now is ....

(5 + 20d or 20 – 5d or 5d + 20 or 5 × (d + 20))

ⓒ The value of the expression $a^2 + 2 \times 3$ when a = 3 is ....

(15 or 33 or 12 or 24)

ⓓ The value of the expression 12 ÷ (16 – 3b) when b = 4 is ....

(4 or 3 or 26 or 10)

ⓔ Which of the following order of operations is used to find the value of the expression $8 + 2 \times (n^2 - 3)$, when n = 5

(Putting the exponent in its simplest form, subtraction, multiplication, addition

or Addition, multiplication, exponentiation in simplest form, subtraction

or Putting the exponent in its simplest form, addition, subtraction, multiplication

or Putting the exponent in its simplest form, multiplication, addition, subtraction)

2 **Complete the following:**

a) If the side length of a square is "s" cm, then the perimeter of the square

= ....

b) The value of the expression 9 x (when x = 5) is ....

c) The value of the expression r^2 (when r = 9) is ....

d) The algebraic expressions "2 x + 3" and "2 (x + 1) are expressions of

.... (equal, not equal)

e) The value of the expression $3 \times (y^2 - 5)$ (when y = 3) is

3 **Fouad studies for "k" hours a day for 5 days, then studies for 6 hours on the sixth day.**

a) Write an algebraic expression for the number of hours he studies in the 6 days. (..........................)

b) If the number of hours he studies in each of the five days is 4 hours.

How many hours did he study in the 6 days? ....

Concept 4.1 Write and Solve Equations and Inequalities

Lesson 1 Solving Algebraic Equations

1 Write the equation that represents each of the following models, and then find the value of "x":

a



Equation: ....

x = ...

b



Equation: ....

x = ...

c



Equation: ....

x = ...

d



Equation: ....

x = ...

e



Equation: ....

x = ...

f



Equation: ....

x = ...

g



Equation: ....

x = ...

h



Equation: ....

x = ...

2 **Find the value of the variable in each of the following equations (solve the equation):**

a) $x + 9 = 12$ = ... = ...	b) $y + 6 = 11$ = ... = ...
c) $3 + b = 5$ = ... = ...	d) $a - 6 = 8$ = ... = ...
e) $6\ m = 24$ = ... = ...	f) $3\ n = 21$ = ... = ...
g) $\frac{s}{4} = 3$ = ... = ...	h) $\frac{1}{5} t = 4$ = ... = ...

3 **Complete the following:**

a) If $x + 3 = 8$, then x = ...

b) If $y - 2 = 9$, then y = ...

c) If $8m = 16$, then m = ...

d) If $\frac{1}{3} n = 3$, then n = ...

e) If $a = 3$, then a + ... = 7.

f) If $b = 5$, then b − ...... = 2.

g) If $d = 4$, then ...... × d = 20.

h) If $k = 12$, then K ÷ ...... = 4.

Assessment 1 on Lesson 1

Unit 4

1 Choose the correct answer:

a) If $a + 8 = 15$, then $a =$ .... (7 or 15 or 8 or 23)

b) If $b = 6$, then $b -$ ...... $= 4$. (10 or 4 or 2 or 6)

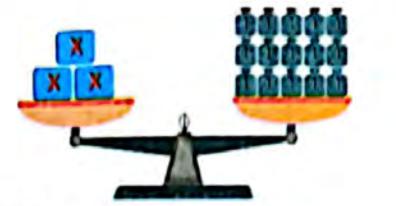
c) If $6x = 42$, then $x =$ .... (38 or 42 or 7 or 48)

d) If $y = 27$, then $\frac{y}{\dots} = 9$. (18 or 3 or 27 or 9)

e) If $4n = 12$, then $6n =$ .... (4 or 12 or 18 or 3)

2 Write the equation that represents each of the following models, and then find the value of "x":

a)



Equation: ....

$x =$ ....

b)



Equation: ....

$x =$ ....

3 Find the value of the variable in each of the following equations (solve the equation):

a) $x + 2 = 7$

= ....

= ....

b) $y - 3 = 8$

= ....

= ....

c) $3a = 21$

= ....

= ....

d) $\frac{n}{5} = 35$

= ....

= ....

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Theme 1

Lessons 2&3 Exploring Inequalities / Solving Inequalities

1 Write the inequality that represents each of the following expressions:

a) All values greater than –1: ....
b) All values less than 2: ....
c) All values to the right of –9 on the number line are: ....
d) All values to the left of the number 2 on the number line are: ....
e) All values greater than or equal to 6: ....
f) All values less than or equal to –8: ....
g) 4 and All values to the left of the number 4 on the number line: ....
h) –2 and All values to the right of –2 on the number: ....
i) Negative integers: .... (Where x is an integer.)
j) Positive integers: .... (Where x is an integer.)
k) Natural numbers: .... (Where x is an integer.)
l) Counting numbers: .... (Where x is an integer.)
m) Non-negative integers: .... (Where x is an integer.)
n) Non-positive integers: .... (Where x is an integer.)

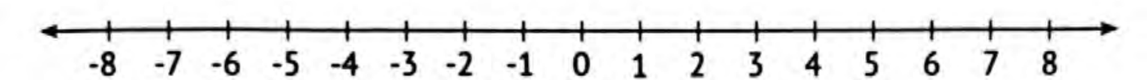
2 Write what each of the following inequalities represents:

a) $x > 9$ all values ....
b) $x > -5$ all values ....
c) $x < 2$ all values ....
d) $x < -7$ all values ....
e) $x \leq -3$ all values ....
f) $x \leq 4$ all values ....
g) $x \geq 3$ all values ....
h) $x \geq 0$ all values ....

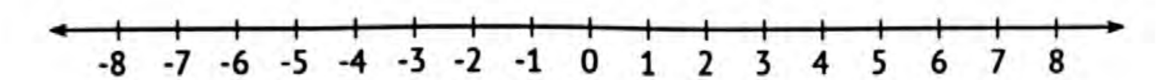
Unit 4

3 **Use the number line to represent each of the following inequalities Where "x" is an integer:**

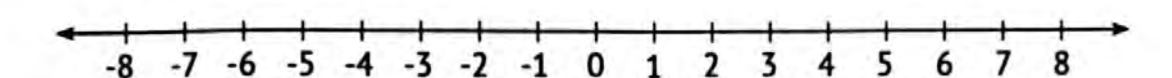
ⓐ $x > -1$



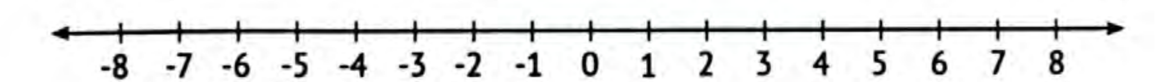
ⓑ $x \geqslant -1$



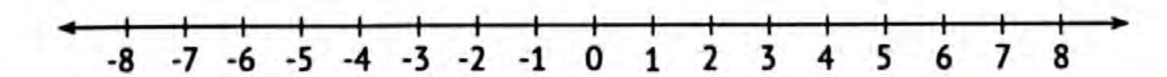
ⓒ $x < 2$



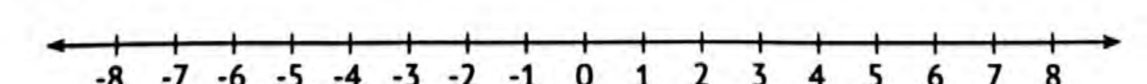
ⓓ $x \leqslant 2$



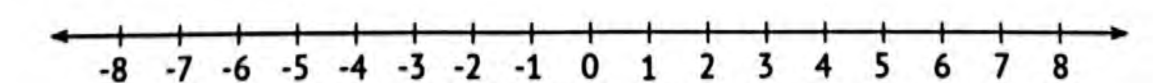
ⓔ $x > 3$



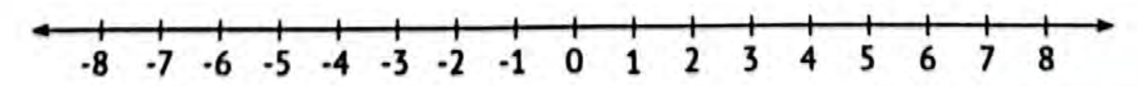
ⓕ $x \geqslant 3$



ⓖ $x < 0$



ⓗ $x \leqslant 0$



4 Choose the correct answer:

a The inequality that represents all values greater than – 1 is ....
($x > -1$ or $x < -1$ or $x \leqslant -1$ or $x \geqslant -1$)

b The inequality that represents all values to the left of 5 on a number line is ....
($x > 5$ or $x < 5$ or $x \leqslant 5$ or $x \geqslant 5$)

c The inequality that represents all values less than or equal to – 7 is .... .
($x > -7$ or $x < -7$ or $x \leqslant -7$ or $x \geqslant -7$)

d The inequality that represents 3 and all the values to the right of 3 on the number line is ....
($x > 3$ or $x < 3$ or $x \leqslant 3$ or $x \geqslant 3$)

e The inequality that represents negative integers are .... (where x is an integer).
($x > 0$ or $x < 0$ or $x \leqslant 0$ or $x \geqslant 0$)

f The inequality that represents non-positive integers .... (where x is an integer)
($x > 0$ or $x < 0$ or $x \leqslant 0$ or $x \geqslant 0$)

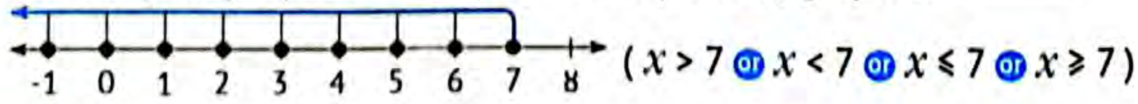
g The graph of the inequalities $x > 3$ and $x < 3$ on a number line are similar in ....
(3 does not belong to the solution set in each of them
or both include all values to the left of 3
or there is a common point between them
or each of them includes all the values to the right of 3)

h The graph of the inequalities $x < 4$ and $x \leqslant 4$ on a number line are similar in ....
(4 does not belong to the solution set in each of them
or each including all values to the left of 4
or there is a common point between them
or each of them includes all the values to the right of the number 4)

i Which of the following values is a solution to the inequality $x < 9$?
(10 or 9.1 or –9.5 or 9)

j Which of the following values is a solution to the inequality $x \geqslant 5$?
(–5 or 4.59 or –25 or 6)

k The inequality represented by the corresponding graph is: ....



($x > 7$ or $x < 7$ or $x \leqslant 7$ or $x \geqslant 7$)

5 **How similar are the graphs of the following pair of algebraic expressions? And what is the difference:**

a $x < -8$, $x \leq -8$

① The similarity

....

....

....

② The differences

....

....

....

b $x \geq -8$, $x \leq -8$

① The similarity

....

....

....

② The differences

....

....

....

c $x = -8$, $x > -8$

① The similarity

....

....

....

② The differences

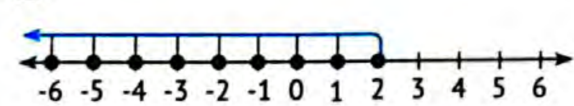
....

....

....

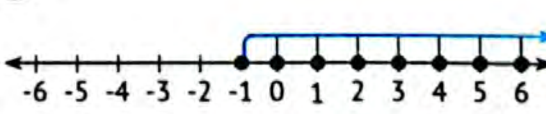
6 **Write the inequality represented by each of the following number lines:**

a



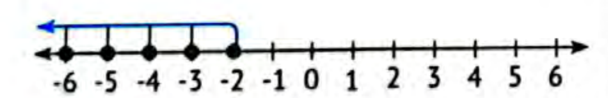
....

b



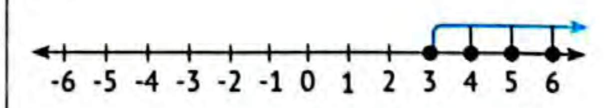
....

c



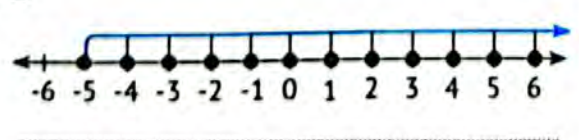
....

d



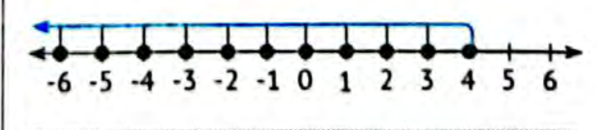
....

e



....

f



....

Assessment 2 on Lessons 2&3

Unit 4

1 Choose the correct answer:

ⓐ The inequality representing the statement "All values greater than −5 are .... ($x > -5$ or $x < -5$ or $x \leq -5$ or $x \geq -5$)

ⓑ The statement that represents the inequality $x < 3$ is: All values .... 3 (greater than or less than or greater than or equal to, less than or equal to)

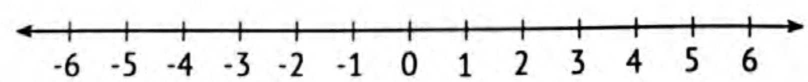
ⓒ The inequality that represents the statement "All values to the right of 0 on a number line are .... ($x > 0$ or $x < 0$ or $x \leq 0$ or $x \geq 0$)

ⓓ Which of the following values is a solution to the inequality $x < -2$? (0 or 1.5 or −3 or −2)

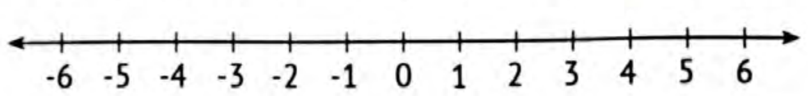
ⓔ Which of the following values is not a solution to the inequality $x > -1$? (1 or 0 or −2 or −0.5)

2 Represent each of the following inequalities on a number line (Where x is an integer):

ⓐ $x > -4$



ⓑ $x \leq 0$

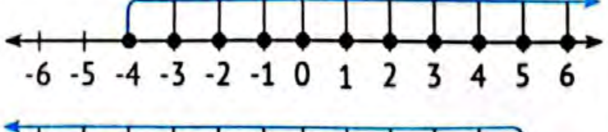


ⓒ $x \geq 1$

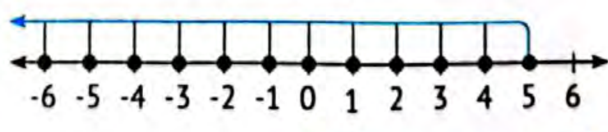
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

3 Write the inequality represented by each of the following number lines:

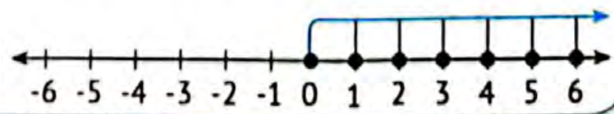
ⓐ ....



ⓑ ....



ⓒ ....



Unit 5 Dependent and Independent Variables

Concept 5.1 Explore Relationships between Two Variable

Lessons 1&2 The Relationship Between Dependent and Independent Variables
Applications on Dependent and Independent Variables

1 Determine the independent variable and the dependent variable in each of the following situations:

a	The money you spend Independent ☐ Dependent ☐	and	The types of games you like Independent ☐ Dependent ☐
b	The menu Independent ☐ Dependent ☐	and	What you order from the food stall Independent ☐ Dependent ☐
c	How much you laughed Independent ☐ Dependent ☐	and	How funny the joke was Independent ☐ Dependent ☐
d	The number of cars in the garage Independent ☐ Dependent ☐	and	The area of the garage Independent ☐ Dependent ☐
e	The number of students participating in the trip Independent ☐ Dependent ☐	and	The number of supervisors Independent ☐ Dependent ☐
f	The number of days of going to the club Independent ☐ Dependent ☐	and	The number of training hours Independent ☐ Dependent ☐
g	The amount of food you eat Independent ☐ Dependent ☐	and	The amount of weight gain Independent ☐ Dependent ☐
h	The speed of the vehicle Independent ☐ Dependent ☐	and	The distance traveled in one hour Independent ☐ Dependent ☐
i	The money you have Independent ☐ Dependent ☐	and	The number of pens you can buy Independent ☐ Dependent ☐

2 Determine the **independent** variable and the **dependent** variable in each of the following relationships:

Relationship	$e = 8 - r$	$\frac{s}{3} = b$	$z + 5 = m$	$y = 5x$
Independent Variable				
Dependent Variable				

Relationship	$2a = b$	$F = t + 4$	$p - 3 = z$	$3m = w$
Independent Variable				
Dependent Variable				

3 The price of one pen is 9 pounds. Complete:

ⓐ The equation represents the relationship between the number of pens (x) and the purchase price (y) is: ....

ⓑ The independent variable is ....

ⓒ The dependent variable is ....

ⓓ The price of 6 pens is: ....

4 15 pounds will be added for the delivery of fast food meals in a restaurant. Complete:

ⓐ The equation represents the relationship between the price of meals (x) and the amount to be paid, including delivery (y).

is: ....

ⓑ The independent variable is ....

ⓒ The dependent variable is ....

ⓓ The required amount if the price of meals is 120 pounds is ....

5 Hazem owns a discount card of 50 pounds. Complete :

ⓐ The equation represents the relationship between Hazem's purchases amounted (x) pounds, the amount to be paid after the discount (y) pounds is ....

ⓑ The independent variable is ....

ⓒ The dependent variable is ....

ⓓ The required amount if the purchase price before the discount is 420 pounds: ....

6 Speed of a car = Distance ÷ Time. If the time is 3 hours.

ⓐ The equation represents the relationship between distance (x) and speed (y) is ....

ⓑ The independent variable is ....

ⓒ The dependent variable is ....

ⓓ Calculate the speed in each of the following cases, such that the time is constant (3 hours):

Distance (km)	420	360	270	210	180
Speed (km per hour)	....	....	....	....	....

7 Complete the following

a In the equation $8x = y$, the independent variable is ....

b In the equation $m - 8 = a$, the dependent variable is ....

c If the price of books depends on the number of books purchased, then:

1 The independent variable is ....

2 The dependent variable is ....

d If the number of baked goods depends on the amount of flour used, then:

1 The independent variable is ....

2 The dependent variable is ....

e If the independent variable is what Ahmed saves each month and the dependent variable is what he saves in a full year, then .... depends on ....

Assessment 1 on Lessons 1&2

Unit 5

1 Choose the correct answer:

a) In "$u = 3 \div w$", the independent variable is .... (w or u or 3 or $\frac{w}{3}$)

b) In "$a = 5\,d$", the dependent variable is .... (5 or a or d or 5d)

c) If the amount of fuel consumed by the car depends on the distance traveled, then The independent variable is ....

(fuel amount or distance traveled or traveled time or temperature)

d) If the independent variable is the area of the school theater, then the dependent variable is ....

(the number of actors participating in the show or the number of seats the theater can accommodate or the number of teachers supervising the show or the duration of the show in minutes)

e) If the dependent variable is the student's score in the exam, then the independent variable is ....

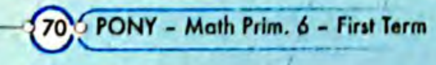
(the type of pen used in the solution or the age of the student or the number of correct answers or the number of questions in the exam)

2 Diaa saves 150 pounds every month, so if the amount he saves in (x) month is (y) pounds, then

a) The equation that represents this situation is ....

b) The independent variable is .... The dependent variable is ....

c) What Diaa saves in a year is ....



3 **The value of one student's participation in a school trip is 90 pounds. If the number of participating students is (x) and the total participation value for all students is (y).**

ⓐ The equation that represents this situation is ....

ⓑ The independent variable is ....

ⓒ The dependent variable is ....

ⓓ If the number of participation is 35 then the total of participation value is ....



Lesson 3 Analyzing the Relationship Between Dependent and Independent Variables

1 Complete the following using variables "x" and "y" where "x" is an independent variable:

	Relation	Equation
a	....	$y = x + 4$
b	....	$y = x - 7$
c	Multiply by 5	....
d	Divide by 7	....
e	....	$y = 2x + 3$
f	....	$y = x \div 2 + 4$
g	Add 7 and then multiply by 2	....
h	Add 6, then divide by 3	....
i	Multiply by 5, then subtract 2	....
j	Divide by 4, then subtract 3	....
k	....	$y = (x - 2) \times 4$
l	....	$y = (x - 9) \div 2$

2 Notice each table, identify the rule, and then complete the pattern:

a



Input (x)	9	10	7	......	12
Output (y)	4	5	2	0	......

Relation: ....

Equation: y = ...

b

Input (x)	3	2	......	6	10
Output (y)	9	6	12	......	30

Relation: ....

Equation: y = ...

c

Input (x)	2	3	4	5	....
Output (y)	8	12	16	....	24

Relation: ....

Equation: y = ...

d

Input (x)	1	2	3	4	....
Output (y)	8	13	18	....	28

Relation: ....

Equation: y = ...

e

Input (x)	3	4	5	6	....
Output (y)	3	6	9	....	21

Relation: ....

Equation: y = ...

f

Input (x)	6	8	10	14	....
Output (y)	0	1	2	....	6

Relation: ....

Equation: y = ...

g

Input (x)	4	7	10	13	....
Output (y)	1	2	3	....	8

Relation: ....

Equation: y = ...

3 Complete the following statements using the variables 'x' and "y":

a If the relation is "add 3.1", then the equation is ....

If x = 2.9, then y will be: ....

b If the relation is "multiplication by 2", then the equation is ....

If x = 8, then y will be: ....

c If the relation is "divide by 3", then the equation is ....

If x = 15, then "y" will be ....

d If the relation is "subtraction from 8" then the equation is ....

If x = 3.5, then "y" will be ....

Theme 2

e If the relation equation is "y" = 3 (x + 5), then the relation is ....

If x = 2, then "y" will be ....

f If the equation y = (9 – x) × 2 then the relation is ....

If x = 3, then "y" will be ....

4 Choose the correct answer from the brackets:

a The equation that expresses the relationship "subtract from 9" is ....

(y = x – 9 or y = 9 – x or y – x = 9 or y = 9 x)

b The equation that expresses the relationship "multiply by 2 and then add 5" is ....

(y = 5x + 2 or y = 2 (x + 5) or y = 5 (x + 2) or y = 2x + 5)

c The equation that expresses the relationship "add 6 then multiply by 3" is .... (y = 3 x + 6 or y = 3 (x + 6) or y = 6 x + 3 or y = (x + 3) × 6)

d The relation that represents the equation: y = $\frac{1}{3}$ x is ....

(divide by 3 or multiply by 3 or divide by $\frac{1}{3}$ or or subtract $\frac{1}{3}$)

e The relation that represents the equation: y = (x – 3) ÷ 2 is ....

(divide by 2, then subtract 3, or subtract 3, then divide by 2 or divide by 3, then subtract 2, or subtract 2, then divide by 3)

f The relation that represents the equation: y = 5 x – 2 is ....

(multiply by 2, then subtract 5, or subtract 2, then multiply by 5 or multiply by 5, then subtract 2, or subtract 5, then multiply by 2)

g If y = 6 x + 4, x = 3 then y = ... (10 or 22 or 18 or 67)

h If y = $\frac{1}{4}$ x – 2, x = 8 then y = ... (0 or 2 or 6 or 30)

i The equation that represents the corresponding table is ....

x	1	3	5
y	4	8	12

(y = x + 3 or y = 4 x or y = (x + 1) × 2 or y = 2 x + 2)

Assessment 2 on Lesson 3

Unit 5

1 Choose the correct answer:

a) The equation that expresses the relationship "add 4" is ....

($y = x + 4$ or $y = 4 - x$ or $y + x = 4$ or $y = 4x$)

b) The relationship that expresses the equation "$y = 5x$" is: ....

(add 5 or multiply by 5 or divide by 5 or subtract 5)

c) If $y = 2(x + 4)$, $x = 5$, then $y =$ .... (11 or 29 or 18 or 14)

d) The equation that expresses the relationship "divide by 2 then add 5" is: ....

($y = 2x + 5$ or $y = \frac{1}{2}x + 5$ or $y = \frac{x + 5}{2}$ or $y = \frac{1}{5}x + 2$)

2 Complete the following table:

	Relationship	Equation	Independent Variable	Dependent Variable	Input x	Output y
a	Add 4, then divide by 3				5	
b	Divide by 2, then subtract 1				8	
c		$y = (x - 5) \times 2$			7	
d		$y = 3x + 4$				16

3 Use the equation "y = 2 x + 3" and complete the following table:

X	2	5	....	....	9	....	3	8	....
Y	....	....	15	17	....	5	....	....	11

Theme 2

Lesson 4 Graph Representation for Dependent and Independent Variables

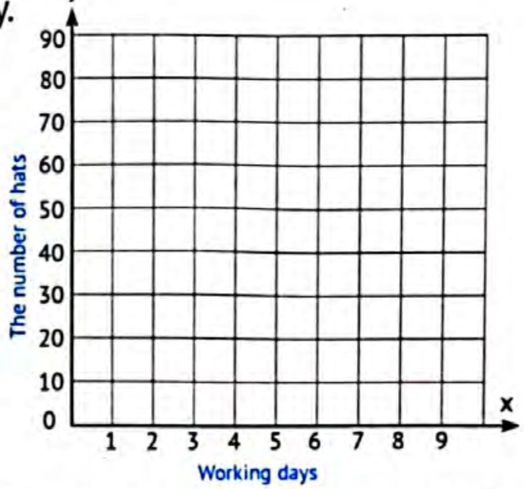
1 **Omar manufactures hats, producing 10 hats per day. Complete the following table representing the number of working days (x), and the number of hats produced (y).**

Write an equation that shows the relationship between the variables "x" and "y" and then represent it graphically.

x	1	2	4	7	....
Y	10	....	....	....	90

The equation

....



2 **A restaurant adds 25 pounds for delivering ready-made meals to customers, regardless of the number of meals.**

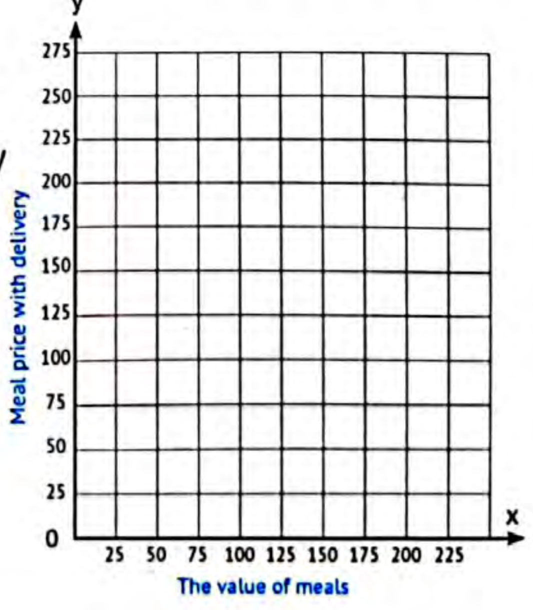
Complete the following table, where the variable "x" represents the value of the meals, and the variable "y" represents the value of the meals after adding the delivery amount.

Write an equation that shows the relationship between the variables "x" and "y" and then represent it graphically

x	25	50	75	....	....
Y	....	....	....	125	150

The equation

....



3 **Nader has a 50-pound discount card at a clothing store.**

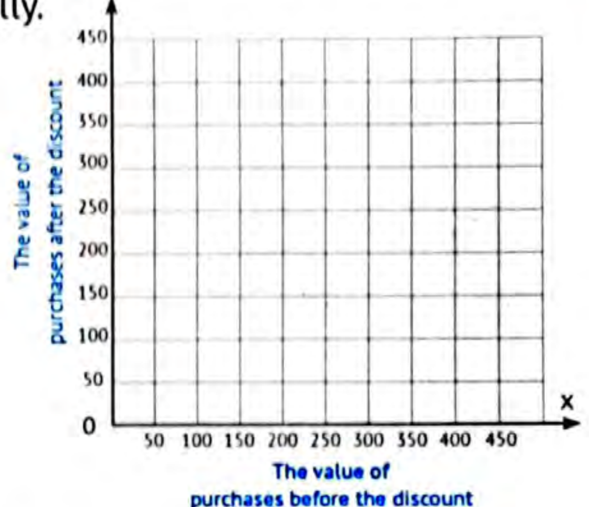
Complete the following table, where the variable "x" represents the value of purchases before the discount, and the variable "y" represents the value of purchases after the discount.

Write an equation that shows the relationship between the variables "x" and "y" and then represent it graphically.

x	300	350	400	....
Y	....	....	....	400

The equation

....



4 **The school has 5 classes for the sixth grade.**

Complete the following table, where the variable "x" represents the number of sixth-grade students in the school.

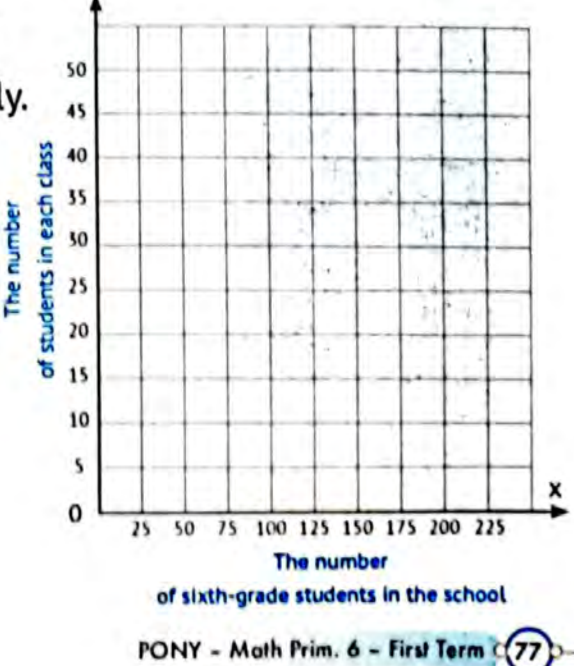
The variable "y" represents the number of students in each class.

Write an equation that shows the relationship between the variables "x" and "y" and then represent it graphically.

x	150	175	....	....
Y	....	....	40	45

The equation

....



Assessment 3 on Lesson 4

Unit 5

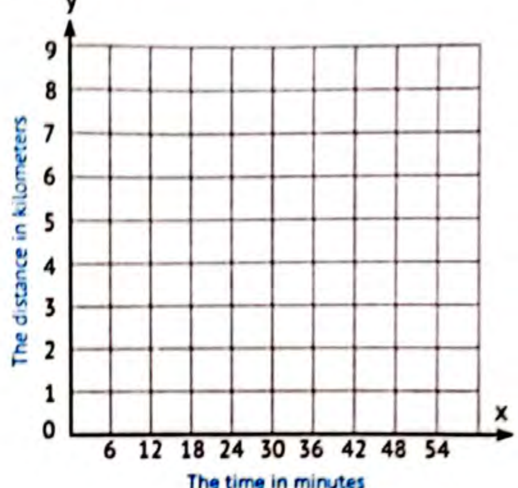
1 **A cyclist on one wheel travels two kilometers in 12 minutes Complete the following table, where the variable "x" represents the time in minutes, and the variable "y" represents the distance in kilometers.**

Write an equation that shows the relationship between the variables "x" and "y", then represent it graphically.

x	6	12	....	....
Y	....	....	3	4

The equation

....



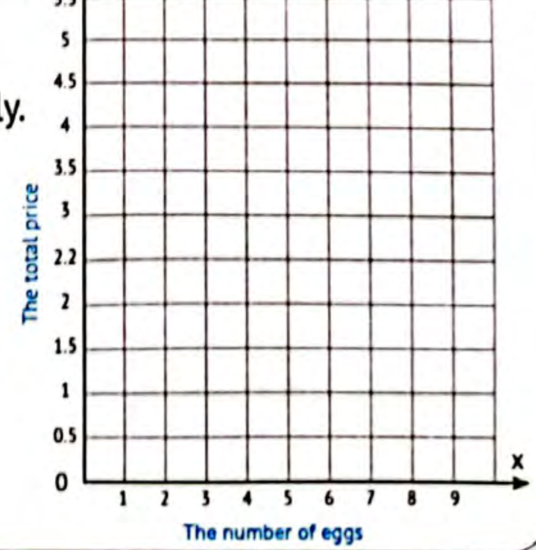
2 **Hossam buys 4 eggs for 6 pounds.**

Complete the following table, where the variable "x" represents the number of eggs, and the variable "y" represents the total price. Write an equation showing the relationship between the variables "x" and "y", and then represent it graphically.

x	1	2	3	4
Y	....	....	....	....

The equation

....



Concept 6.1 Applications on Collecting and Representing Data

Lesson 1 Data and Statistical Questions

1 **Select the type of each of the following questions:**

(A statistical question or a non-statistical question)

	The question	Statistical	Non-statistical
a	What is your favourite subject?		
b	What is the most favourite color for the class's students?		
c	What is your name?		
d	How many members of your family?		
e	How old are you ?		
f	How many students are there in your school classes?		
g	What is the most favorite sport for the class's students?		
h	Do you practice swimming?		
i	How much money do students spend in a class per day?		
j	What color are the eyes of the students in your class?		

Theme 2

2 **Determine whether the results from each question would give you numerical data or categorical data.**

	Question	Numerical Data	Categorical Data
a	How many students' families are in your class?		
b	What is the most favorite sport for the class's students?		
c	What football teams do your students support?		
d	What is the monthly income of the employees of the most profitable companies?		
e	What are the heights of the students in your class?		
f	How many hours did the workers work in your father's factory?		
g	What are the blood groups of the students in your class?		
h	What are the weights of the students in your class?		
i	How many brothers and sisters does each of the students in your class have?		
j	What is the most favourite subject for the students in your class?		

3 Complete the following:

ⓐ Types of statistical questions are .... questions and .... questions.

ⓑ Types of statistical data are .... data and .... data.

ⓒ .... data is written in the form of numbers.

ⓓ .... data is written in the form of words.

ⓔ What is your eyes' color? it is a .... question, while what color are the eyes of the students in your class? is a .... question.

ⓕ Do you like the red color? is a .... question, while what are the pupils' favourite colors? is a .... question.

ⓖ The monthly income of an institution's employees is a .... data.

ⓗ The number of letters in each student's first name is a .... data.

ⓘ The types of pens preferred by your class's students is a .... data.

ⓙ The types of pets owned by the class's pupils are a .... data, while the number of pets owned by the class's pupils, is a .... data.

4 Choose the correct answer:

ⓐ A statistical question ....

(results in a lot of different answers or its answer is yes or no or has one answer or its answer is one number)

ⓑ .... are categorical data.

(Dates of birth or Ages or Weights or Favorite colors)

c .... are/is categorical data.

(The number of students in each class or The number of family members or Favorite TV shows or Test scores)

d .... are numerical data.

(Preferred colors or Blood groups or Birthplaces or Ages)

e .... are numerical data.

(Salaries or Favorite sports or Eye colors or Nationalities)

f All of the following are categorical data, except ....

(favourite foods or occupations or weights or eye colors)

g All of the following are categorical data, except ....

(marital statuses or heights or place of birth or skin color)

h All of the following are numerical data, except ....

(temperatures or lengths or names or weights)

i All of the following are numerical data, except ....

(types of pets or test scores or ages or number of pets)



Assessment 1 on Lesson 1

Unit 6

1 Complete the following:

ⓐ Numerical statistical data are written in the form of ....

ⓑ Categorical statistical data are written in the form of ....

ⓒ What is your favorite school subject? is a .... question.

(statistical / non-statistical)

ⓓ How many books do the students in your class read in a year?

is a .... question. (statistical / non-statistical)

ⓔ The favorite colors of a number of pupils are .... data.

(numerical, categorical)

2 Complete the following table:

The question	Statistical		Non-StatistiCal
	Numerical	Categorical	
ⓐ What's your height?			
ⓑ What is your classmates' favorite sport?			
ⓒ Do you go jogging?			
ⓓ What football teams do your students support?			
ⓔ How many hours do you spend in school?			
ⓕ What are the weights of the students in your class?			
ⓖ How many family members does each of the students in your class have?			
ⓗ What subject do you prefer?			



Lessons 2&3 Exploring the Histogram / Representing Data Using Histograms

1 **What is the best graph in the following situations?**

(Dot Plot - Bar Graph - Histogram)

a) How many students prefer the red color? (..........)

b) How many students got grades in the exam from 15 to 20? (..........)

c) What is the number of pupils in each class of the school? (..........)

d) How many students in your class have a family of 5? (..........)

e) How many Egyptian cities have a population of 2,000,000 to 3,000,000? (..........)

f) How many trees in the garden have a height of 3 to 4 meters? (..........)

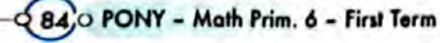
g) How many passengers are in the first-class train? (..........)

h) How many cities had a temperature of 40 degrees last summer? (..........)

i) How many students get 15 degrees in the monthly exam? (..........)

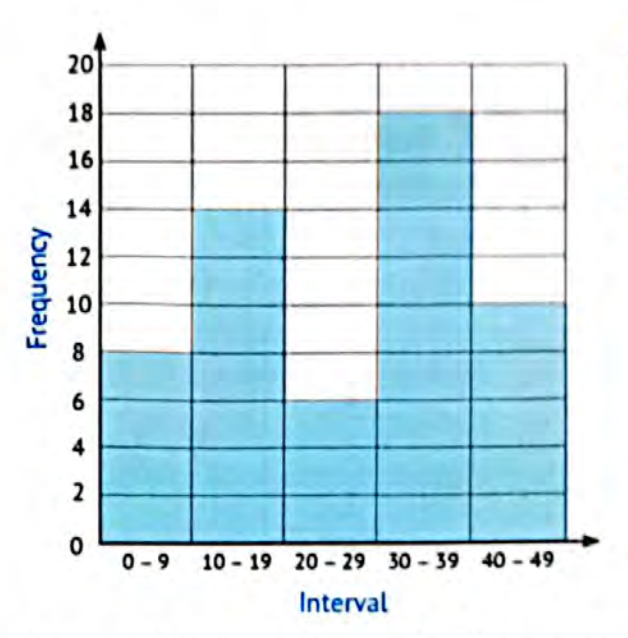
j) How many students had 7-10 days of defective days during the past year? (..........)

k) How many students in your class are between 150 and 160 cm in height? (..........)



2 Complete the following interval table, using the following histogram:

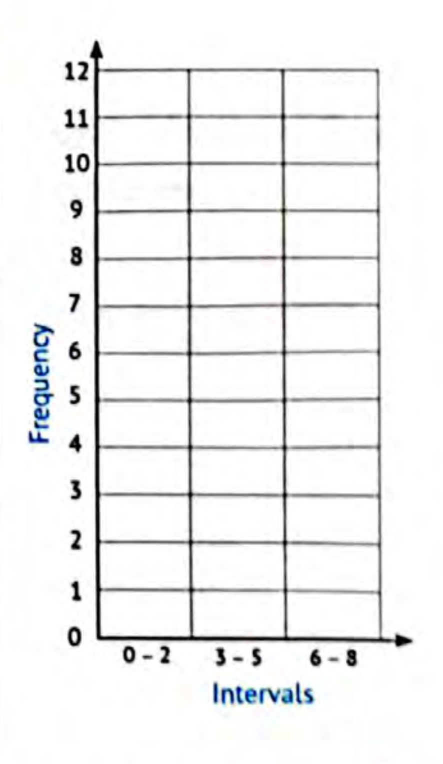
Intervals	Frequency
0 – 9	....
10 – 19	....
20 – 29	....
30 – 39	....
40 – 49	....



3 The following frequency table shows the number of days of absence for 26 students in the class during the first semester. Compose a table of periods and then complete the iterative drawing:

Number of Days	Frequency
0	3
1	2
2	5
3	4
4	6
5	1
6	0
7	3
8	2

Intervals	Frequency
0 – 2	....
3 – 5	....
6 – 8	....

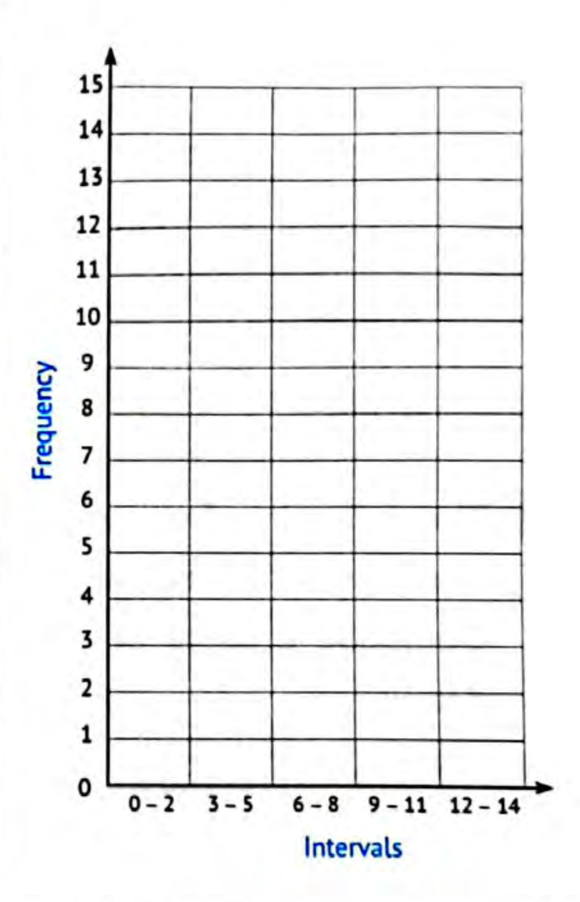


Theme 2

4 **The following frequency table shows the number of stories that students read during the school year. Complete the interval table, then complete the frequency histogram drawing:**

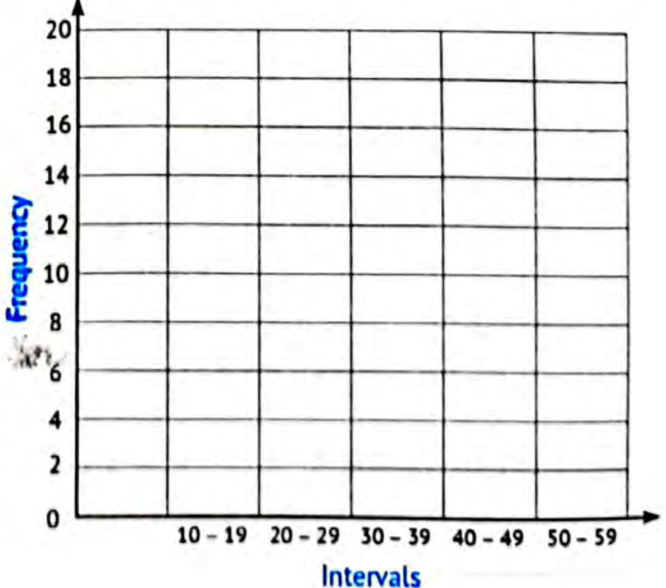
Number of Stories	Frequency
0	2
1	3
2	4
3	1
4	2
5	1
6	1
7	4
8	3
9	1
10	2
11	1
12	2
13	1
14	1

Intervals	Frequency
0 – 2	....
3 – 5	....
6 – 8	....
9 – 11	....
12 – 14	....



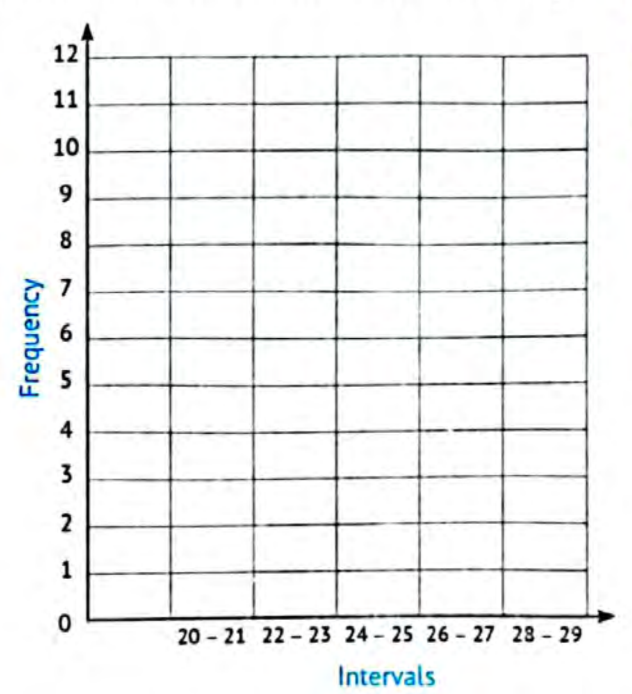
5 **Draw the histogram of the following distribution, which represents the scores of 50 students:**

Interval Grades	Frequency Number of students
10 – 19	8
20 – 29	14
30 – 39	6
40 – 49	18
50 – 59	4



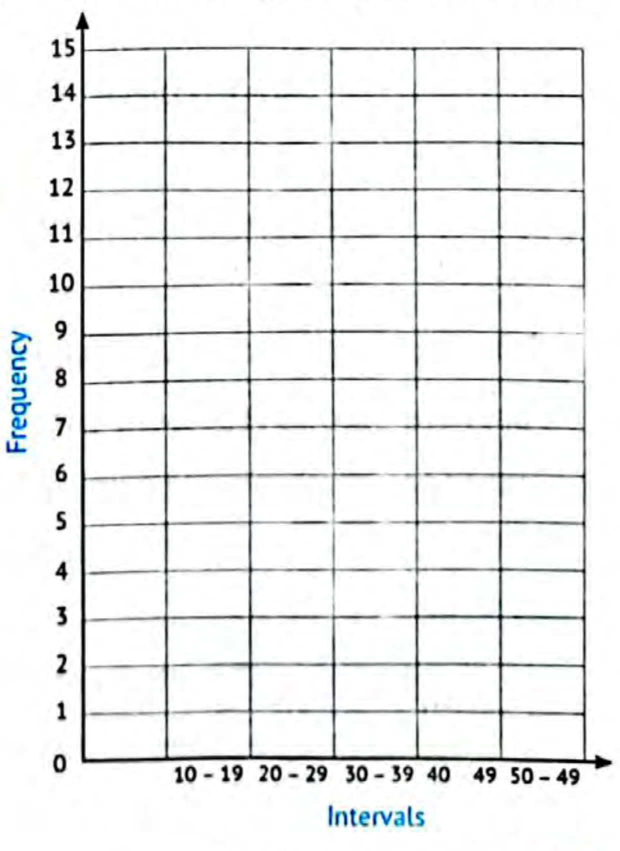
6 Draw the histogram of the following frequency distribution that represents the recorded temperatures in 40 cities in one day:

Interval Temperatures	Frequency Number of Cities
20 – 21	8
22 – 23	12
24 – 25	9
26 – 27	7
28 – 29	4



7 The following table shows the number of cars violating traffic lights that were detected by surveillance cameras at different time periods. Draw the histogram for this frequency distribution:

Interval In Minutes	Frequency Number of Cars
10 – 19	6
20 – 29	7
30 – 39	15
40 – 49	8
50 – 59	12



8 Choose the correct answer:

a) The horizontal axis includes numerical periods in ....
(dot plot or bar graph or double bar graph or histogram)

b) .... don't have a vertical axis.
(Dot plots or Bar graphs or Double bar graphs or Histograms)

c) .... may use separate columns to represent the data.
(Dot plots or Bar graphs or Double bar graphs or Histograms)

d) .... have horizontal axis.
(Bar graphs or Double bar graphs or Histograms or All of the previous)

e) In the dot plots, ... (columns are used to represent data
or there is no need for a horizontal axis
or each information is represented by a point
or data is displayed grouped in intervals)

f) In the bar graph, ...
(each bar represents a number or one categorical data
or it does not need a vertical axis or the bars must touched
or each piece of information is represented by a dot)

g) In the histogram, ... (it does not need a vertical axis
or the bars must touch or data is shown above the number line
or all bars are evenly spaced)

h) In each of the bar graphs and histograms ....
(bars are used to represent data or each bar represents an interval
or each bar represents one number or the data is shown above the number line)

i) In .... there is a graduated scale for the vertical axis.
(the dot plot only or the bar graph only
or histogram only or both of bar graph and histogram)

j) .... may be used to display numerical data.
(Dot plots or Bar graphs or Histograms or All of the previous)

Assessment 2 on Lessons 2&3

Unit 6

1 Choose the correct answer:

ⓐ The best graph to represent the number of pupils whose height ranges from 150 to 160 cm is .... (dot plots or bar graph or histogram)

ⓑ The best graph to represent the number of students absent on a Sunday is .... (dot plots or bar graph or histogram)

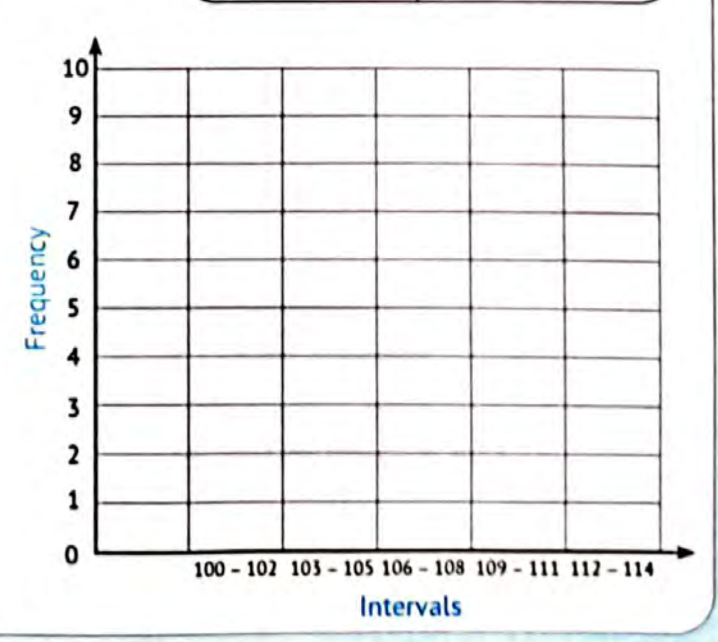
ⓒ A .... has two axes, horizontal and vertical.
(bar graph or double bar graph or histogram or all of the previous)

ⓓ The bar graph .... (can display numerical and categorical data or can display only numerical data or can display only categorical data)

2 The following frequency table represents lengths of a number of students in the class, rounded to the nearest centimeter:

Length in Centimeters	Frequency Number of Pupils
100	2
101	3
102	1
104	2
106	3
107	4
108	1
109	5
110	2
111	1
113	2
114	5

Intervals	Frequency
100 – 102	....
103 – 105	....
106 – 108	....
109 – 111	....
112 – 114	....



Theme 2

Lesson 4 Exploring Box Plot

1 **Complete the following:**

ⓐ The median of a set of values is the element that appears in .... of that set.

ⓑ The median of the set of values (5, 7, 8, 3, 6) is ....

ⓒ The median of the set of values (9, 3, 7, 5) is ....

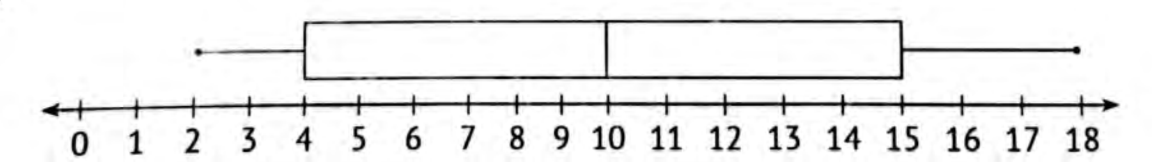
ⓓ The minimum value of (7, 8, 5, 7, 3) is ....

ⓔ The maximum value of (6, 3, 2, 4, 1) is ....

ⓕ In the values (7, 6, 2, 9, 6, 0, 6), the lower quartile is .... and the upper quartile is ....

2 **In each of the following, use the following box plots, select a summary of the five values:**

ⓐ

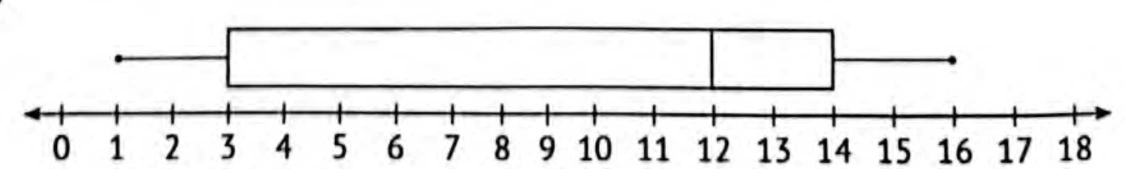


[1] The minimum value: .... [2] Lower quartile: ....

[3] The median: .... [4] Upper quartile: ....

[5] The maximum value: ....

ⓑ



[1] The minimum value: .... [2] Lower quartile : ....

[3] The median: .... [4] Upper quartile: ....

[5] The maximum value: ....

c

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

1 The minimum value: .... 2 Lower quartile: ....

3 The median: .... 4 Upper quartile: ....

5 The maximum value: ....

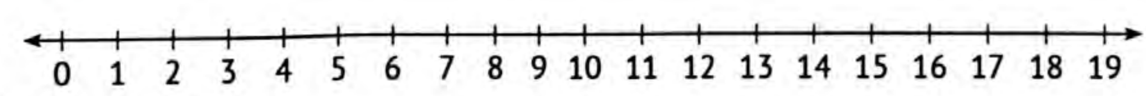
3 Draw a box plot for each of the following groups of values:

a 9, 8, 3, 1, 10

1 The minimum value: .... 2 Lower quartile: ....

3 The median: .... 4 Upper quartile: ....

5 The maximum value: ....

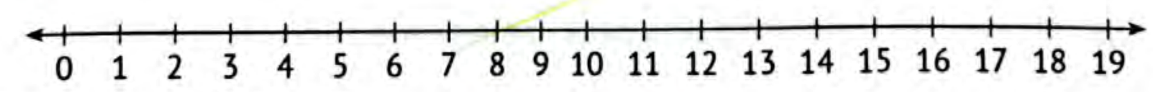


b 15, 8, 9, 2, 7, 5, 4

1 The minimum value: .... 2 Lower quartile: ....

3 The median: .... 4 Upper quartile: ....

5 The maximum value: ....

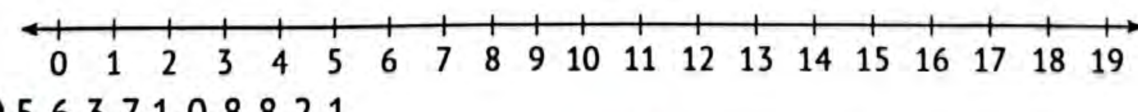


c 3 , 8 , 1 , 9 , 5 , 6 , 5 , 1

1 The minimum value: .... 2 Lower quartile: ....

3 The median: .... 4 Upper quartile: ....

5 The maximum value: ....

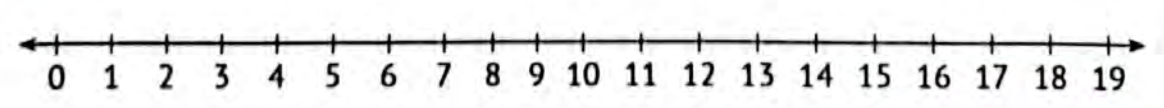


d 5, 6, 3, 7, 1, 0, 8, 8, 2, 1

1 The minimum value: .... 2 Lower quartile: ....

3 The median: .... 4 Upper quartile: ....

5 The maximum value: ....



Assessment 3 on Lesson 4

Unit 6

1 Complete the following:

a) The median of the set of values (9, 8, 4, 5, 8) is ....

b) The median of the set of values (3, 4, 2, 12, 8) is ....

c) The minimum value (7, 2, 6, 1, 9, 8) is ....

d) The maximum value (4, 7, 1, 8, 6) is ....

e) The set of values (5, 3, 1, 9, 8, 6, 7), the lower quartile is .... and the upper quartile is ....

2 For the set of values: 10, 9, 8, 7, 6, 4, 2:

Choose the correct answer:

a) The minimum value: .... (2 or 7 or 4 or 2)

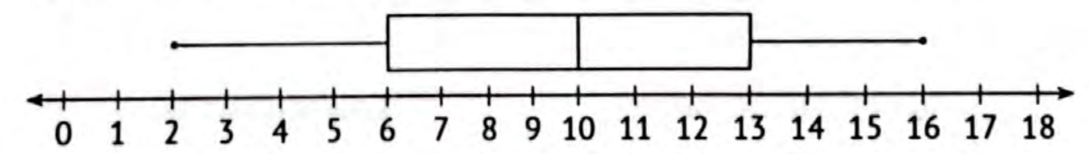
b) Lower quartile: .... (2 or 9 or 7 or 4)

c) The median: .... (4 or 7 or 9 or 10)

d) Upper quartile: .... (7 or 4 or 9 or 8)

e) The maximum value: .... (4 or 6 or 7 or 10)

3 Using the following box plot, select the 5-point summary:



a) The minimum value: ....

b) Lower quartile: ....

c) The median: ....

d) Upper quartile: ....

e) The maximum value: ....

4 Draw a box plot for the values (5, 2, 9, 4, 3, 6, 2):

a) The minimum value: ....

b) Lower quartile: ....

c) The median: ....

d) Upper quartile: ....

e) The maximum value: ....

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

Lesson 5 Applications on Data Representations

1 Match each of the following with the appropriate graph:

a Representation of individual values •	• Histogram	1
b Representation of hundreds of notes •	• Dot plot	2
c Representation of data pealcs and gaps in the data •	• Box plot	3

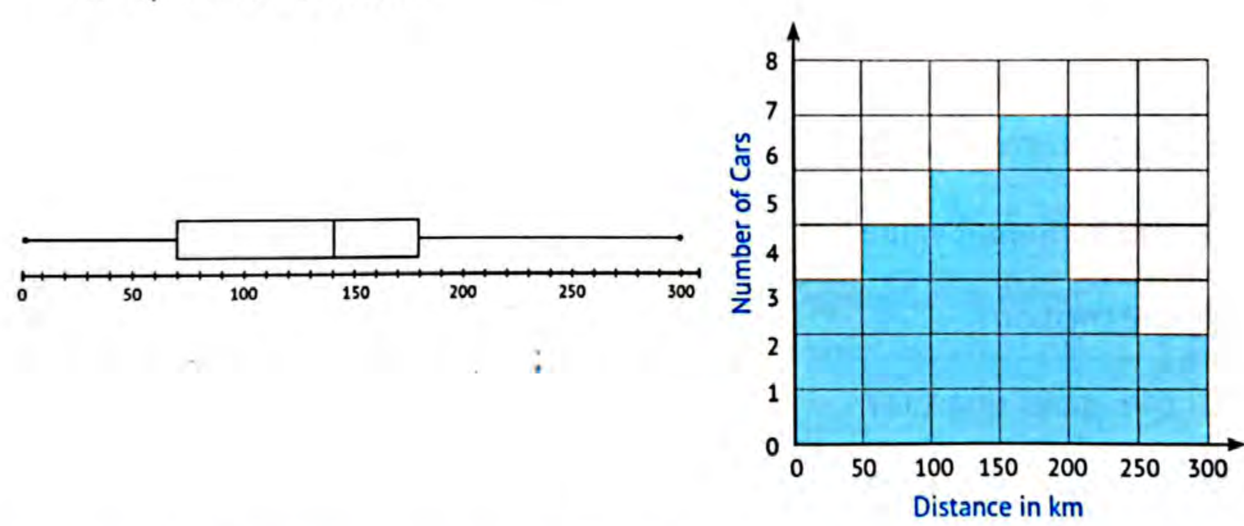
2 Identify the best graph that can be used to answer the following statistical questions:

	Question: What is	Graph		
		Dot Plot	Histogram	Box Plot
a	the maximum value?			
b	the minimum value?			
c	the median?			
d	the upper quartile?			
e	the lower quartile?			
f	the total number of values?			
g	the number of times a specified value repeats?			
h	the most frequent value?			
i	the least frequent value?			
j	the number of repetitions of values in a specified interval?			



k	the number of repeat values for a set of intervals?			
l	the number of values less than a specified value?			
m	the number of values greater than a specified value?			
n	the range?			
o	the gaps?			

3 **Ahmed owns a showroom for used cars. Ahmed checked the odometers of these cars and recorded the kilometres traveled by each car. He represented these results using the histogram and the box plot as shown:**



a Answer the following, explaining the best graph that helped you in the answer:

	Question	Answer	Graph	
			Histogram	Box plot
1	How many cars have driven more than 200 km?			
2	What is the median value?			

3	What is the minimum distance traveled by a car?			
4	What is the greatest distance traveled by a car?			
5	How many cars drove from 50 km to 100 km?			

b Write two questions that can be answered using:

1 Histogram

....

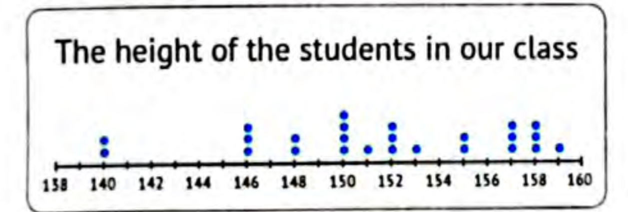
....

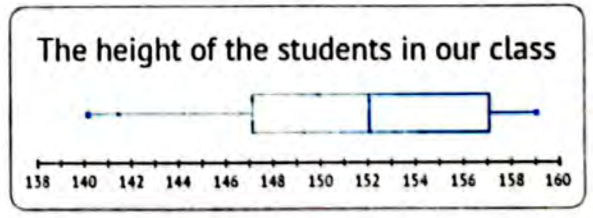
2 Box plot

....

....

4 The dot plot and the following box plot show the heights of a number of pupils in your class:





a Answer the following, explaining the best graph that helped you in your answer.

	Question	Answer	Graph	
			Dot plot	Box plots
1	How many students are 150 cm tall?			
2	What is the median value?			
3	What is the height of the shortest student?			
4	How tall is the tallest student?			
5	How many students are less than 149 cm tall?			



b Write two questions that can be answered using both graphs:

....

....

5 **The following table shows data on the amount of time that sixth graders spend listening to music each week.**

Number of Minutes Students Spent Listening to Music per Week									
120	15	45	30	60	90	0	125	30	240
75	45	80	10	20	35	45	90	100	115
75	40	70	100	120	120	150	15	0	20
5	120	45	80	10	45	50	100	15	0
20	35	120	150	30	60	90	20	35	40

What is the most appropriate graph if you want to determine the number of minutes students typically spend listening to music?

(..)

Assessment 4 on Lesson 5

Unit 6

1 Match each question with the appropriate drawing or drawings:

a How many times does a specified value repeat?	•	• Histogram 1
b What is the median value?	•	• Dot plot 2
c How many times is the value repeated in a given period?	•	• Box plot 3

2 The dot plot and histogram below show the exam scores for a number of students in your class:

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Exam scores

Number of Students: 2 4 6 8 10

0 - 9 20 - 29 40 - 59 60 - 79 80 - 99

Exam Scores

Answer the following, explaining the best graph that helped you in the answer:

a What is the highest grade obtained by the students?

(Answer: ....) (Best Graph: ....)

b What is the lowest score obtained by the students?

(Answer: ....) (Best Graph: ....)

c How many students did you score on the drawing?

(Answer: ....) (Best Graph: ....)

d How many students got less than 40 marks?

(Answer: ....) (Best Graph: ....)

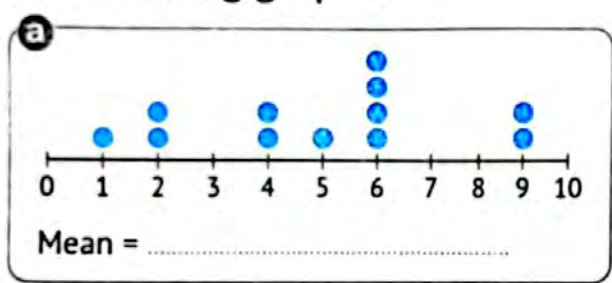
e How many students got 80 degrees or more?

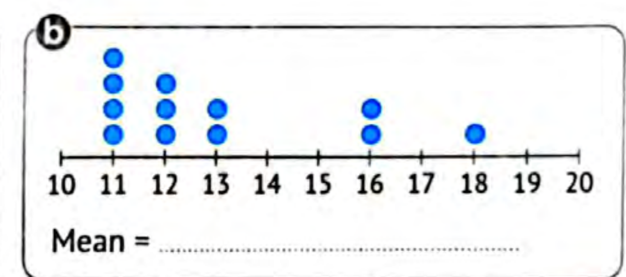
(Answer: ....) (Best Graph: ....)

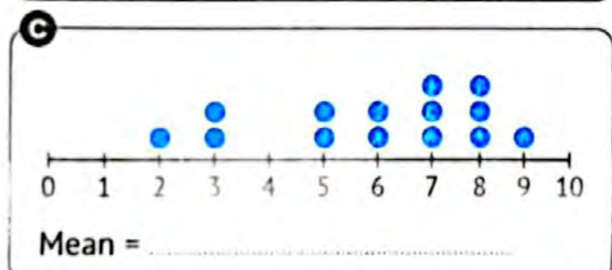
Concept 7.1 Exploring Measures of Central Tendency and Spread

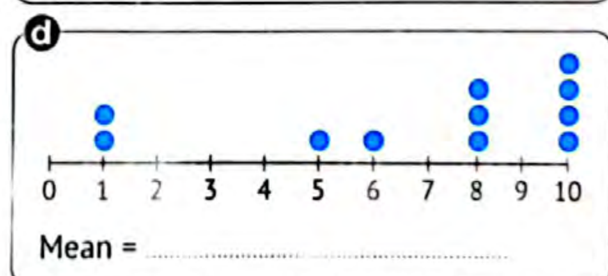
Lessons 1&2 Exploring the Balance of Data Sets / Interpreting Arithmetic Mean

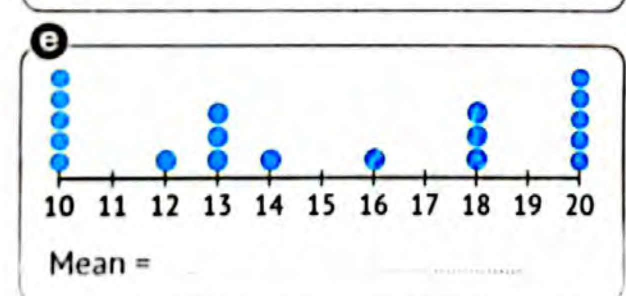
1 Determine the **mean** (the center of the data set) for each of the following graphs:

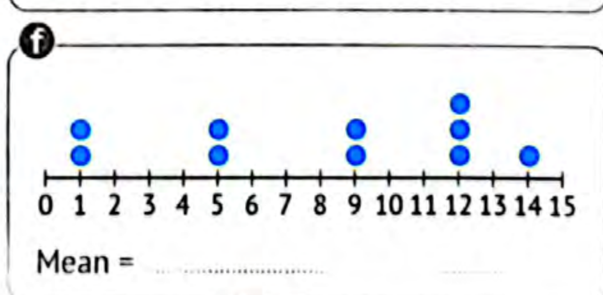
a


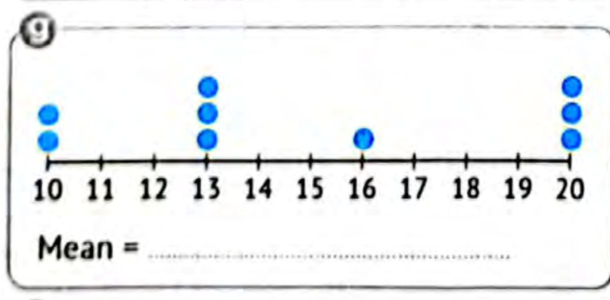
b


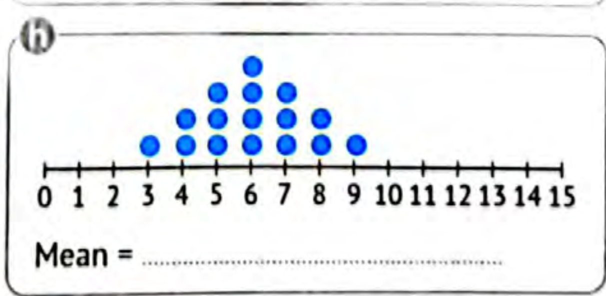
c


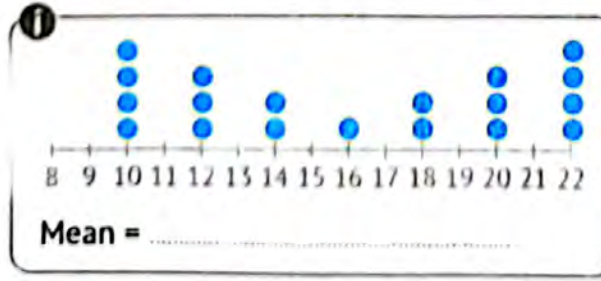
d


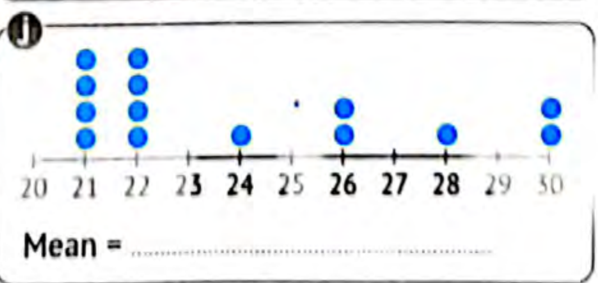
e


f


g


h


i


j


Unit 7

2 Find the mean for each of the following groups of values:

	Values	Mean
a	4, 6	....
b	3, 8	....
c	2, 4, 6	....
d	1, 3, 5	....
e	1, 2, 3, 4, 5	....
f	35, 50, 60, 55	....

3 If the heights of five pupils in the first preparatory grade in centimeters are: 124, 130, 122, 126, and 128.

Calculate the mean for these lengths.

....

....

4 If Sheriff's grades in 3 consecutive months in Mathematics are 89, 91, and 96, then calculate his mean of grades.

....

....

5 If the temperatures for a full week of December in one of the cities are: 25°, 27°, 31°, 23°, 22°, 18°, and 22°, then calculate the mean of these degrees.

....

....

Theme 2

6 **If the number of goals scored by Al-Ahly in 6 matches is:**

4, 2, 3, 1, 0, and 2, then calculate the mean for the number of goals.

....

....

7 **The following table represents the number of study hours for a student during 6 consecutive days:**

Day	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Number of Hours	$3\frac{1}{2}$	3	$2\frac{1}{2}$	3	4	2

Calculate the mean of study hours per day.

....

8 **Complete the following:**

ⓐ The mean of the values (18, 35, 34, 6) is ....

ⓑ The mean of the values (6, 3, 1, 7, 6, 2, 1, 6) is ....

ⓒ If the mean of the values (3, 4, 6, x, 7) is 6, then the value of x is ....

ⓓ If the mean of the values (2, 7, 2, x) is 3, then the value of x is ....

ⓔ If the sum of 7 values equals 56, then the mean of these values is ....

ⓕ If the sum of a set of values is 45, and the mean of these values is 5, then the number of these values is ....

ⓖ If the mean of a set of values is 8 and the number of these values is 6, then the sum of these values is ....

9 Choose the correct answer:

a The mean of the values (6, 7, 8, 4, 10) is .... (35 or 7 or 10 or 4)

b The mean of the values (4, 9, 7, 1, 1, 2) is .... (4 or 2 or 3 or 24)

c If the mean of a set of values is 3 and the number of these values is 8, then the sum of the values is equal to .... (11 or 24 or 5 or 8)

d If the mean of a set of values is 9 and the sum of these values is 45, then the number of these values is .... (5 or 45 or 50 or 9)

e If the mean of the scores of five students is 20, then the sum of their scores is .... a degree (4 or 15 or 25 or 100)

f If the mean of Manal and Siham's ages is 7 years, and Manal's age is 8 years, then Siham's age is .... years. (6 or 7 or 8 or 15)



Assessment 1 on Lessons 1&2

Unit 7

1 Complete the following:

ⓐ The mean of the values (8, 3, 13) is ....

ⓑ The median of the values (8, 3, 4, 2) is ....

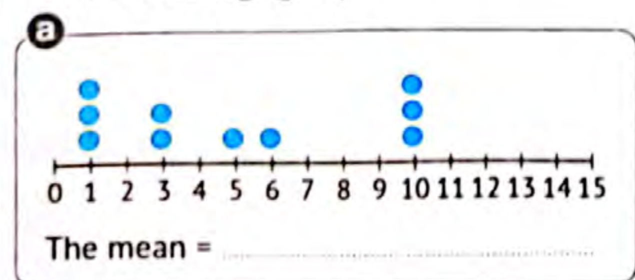
ⓒ If the sum of a group of values is 18, and the mean of these values is 3, then the number of these values is ....

ⓓ If the mean of 5 values is 15, then the sum of these values is ....

ⓔ If the mean of the values: 8, 3, 5, x, 2 is 7, then the value of x is ....

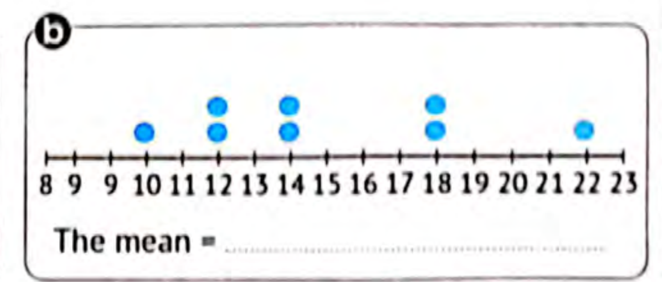
2 Determine the mean (the center of the data set) for each of the following graphs:

ⓐ



The mean = ...

ⓑ



The mean = ...

3 If the number of working hours for a worker in a factory is 5 consecutive days, as follows:

Day	Sunday	Monday	Tuesday	Wednesday	Thursday
Number of Working Hours	$6\frac{1}{2}$	7	8	$4\frac{1}{2}$	6

Calculate the mean of working hours per day.

....

4 If the sales of a commercial store are in pounds for a period of 4 days, they are: 60,050, 36,450, 42,000, 25,500 Calculate the mean of sales of the store.

....

Lesson 3 Exploring Median, Mode, and Outliers

1 Find the **mode** for each of the following set of values:

	Values	Mode
a	6, 7, 8, 6, 5	....
b	9, 5, 5, 9, 7, 3	....
c	4, 9, 1, 0, 8	....
d	9, 3, 2, 9, 3, 9, 7	....
e	12, 18, 19, 22, 12, 12	....
f	10, 19, 17, 16, 15	....
g	1, 2, 8, 9, 1, 3, 1	....
h	3, 0, 8, 2, 9, 30	....
i	3, 3, 5, 3, 6, 6, 6	....
j	4, 14, 24, 42, 41, 44	....

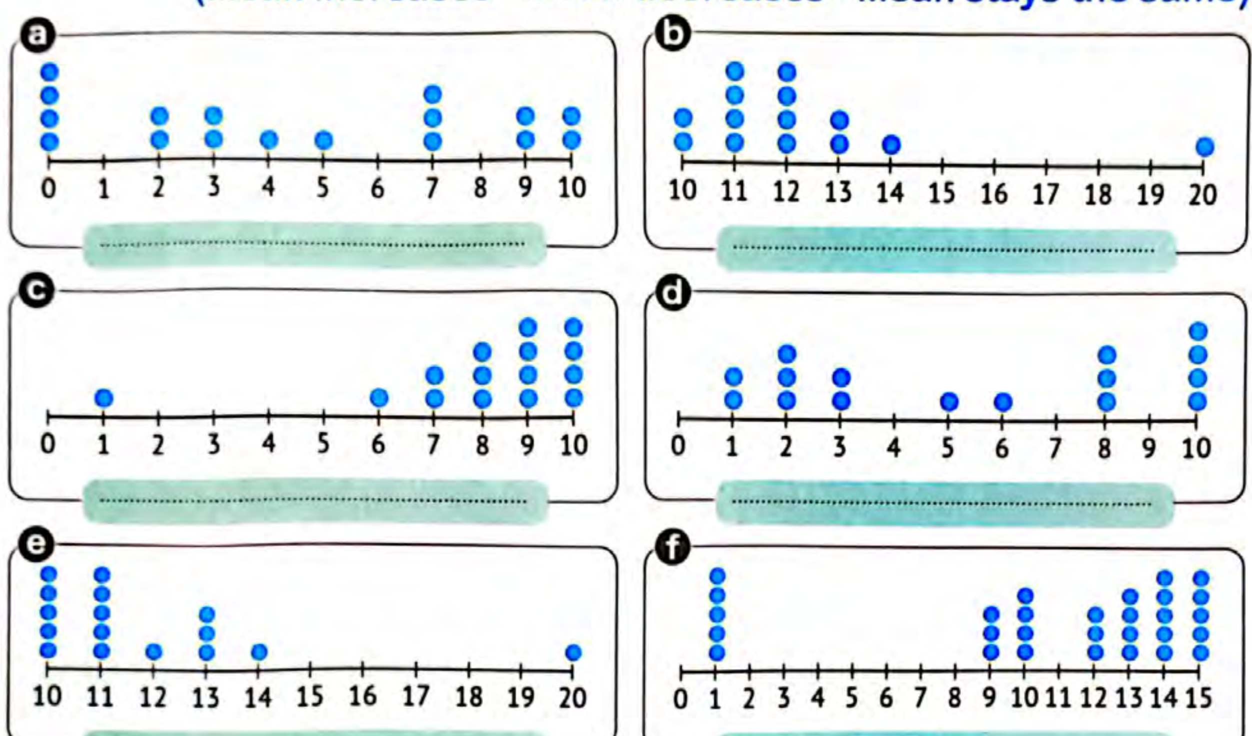
2 List the **outliers** in each of the following values:

	Values	Outliers
a	6, 8, 28, 7, 5	....
b	25, 30, 27, 2, 29	....
c	24, 24, 200, 25, 26	....
d	45, 52, 63, 4, 59	....
e	25, 24, 25, 26, 24, 26	....
f	142, 125, 130, 135	....
g	11, 9, 10, 50, 12, 9, 51	....
h	63, 75, 219, 56, 72, 220	....
i	0, 3, 6, 7, 5, 1, 6	....
j	100, 150, 50, 200, 100, 150	....

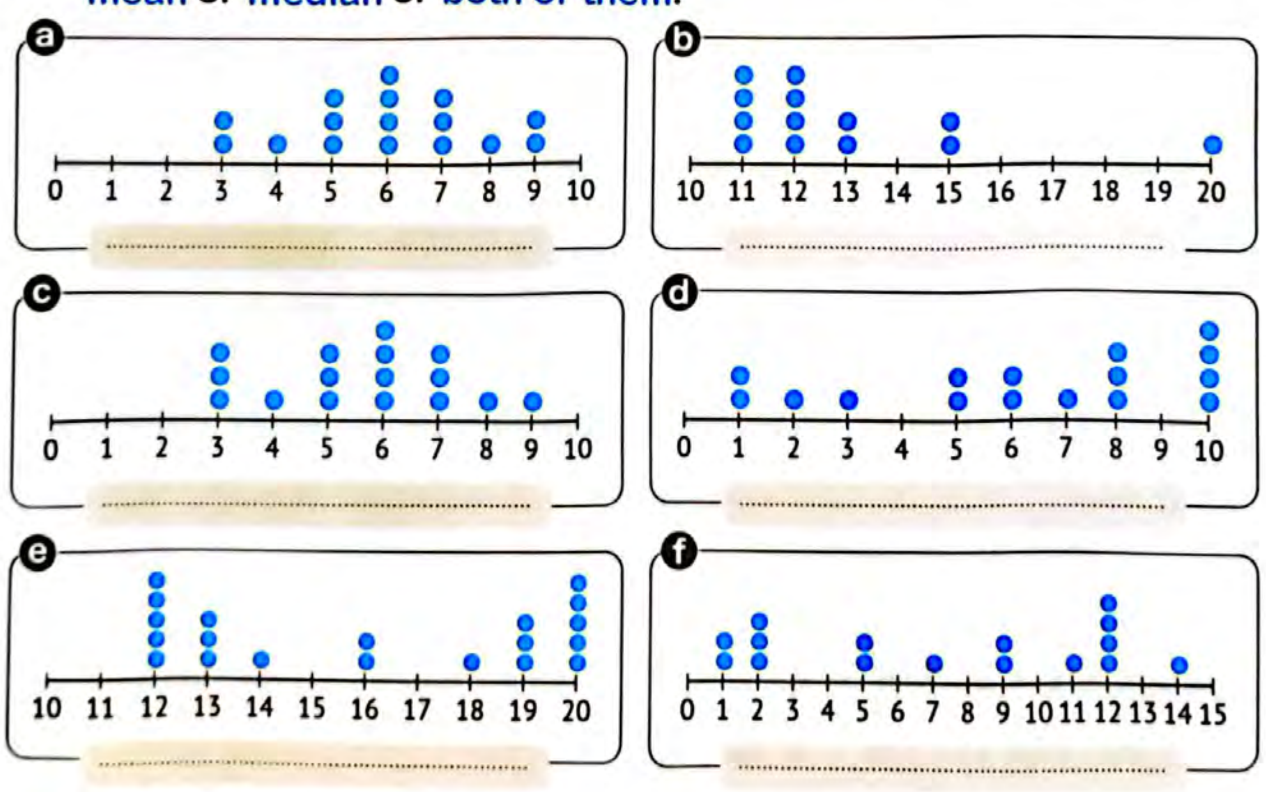


3 **Choose the correct description that applies to each graph below.**

(Mean increases - Mean decreases - Mean stays the same)



4 **For each of the following data representation charts, choose the measure of central tendency that you think would be best used, mean or median or both of them.**



5 **Complete the following table using the dot plot graph for each of the following,**

	Graph	Mean	Median	Mode	Outliers
a	0 1 2 3 4 5 6 7 8 9 10				
b	10 11 12 13 14 15 16 17 18 19 20				
c	5 6 7 8 9 10 11 12 13 14 15				
d	20 21 22 23 24 25 26 27 28 29 30				

6 **Complete the following:**

a The mode of a set of data is .... in that set.

b The mode of the values (9, 2, 6, 7, 2, 8) is ....

c The outlier in the set of values (9, 8, 7, 25, 6) is ....

d The mean increases if the outliers are .... than the other values.

e The mean is .... if the outliers are less than the other values.

f The mean is .... by the outliers in the data set.

g The median is .... by the outliers in the data set.

h If the graph is skewed to one side, then .... will be the best choice as a measure of the center.

i If the graph is evenly distributed, then .... will be the best choice as a measure of the center.

Assessment 2 on Lesson 3

Unit 7

1 Complete the following:

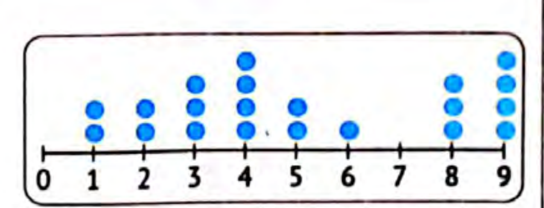
a) The mode of the values (3, 25, 15, 5, 3) is ....

b) The mode of the values (pen, ruler, eraser, pen, ruler, pen) is ....

c) If the mode of the set of values (6, 2, 4, x, 3) is 6, then x = ...

d) .... is affected by the outliers in the data set.

e) .... will be the best choice as a measure of the center in the opposite graph (mean or median).

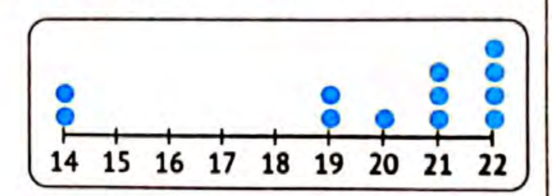


2 Choose the correct answer:

a) The values (5, 3, 2, 5, 2, 7) have ....

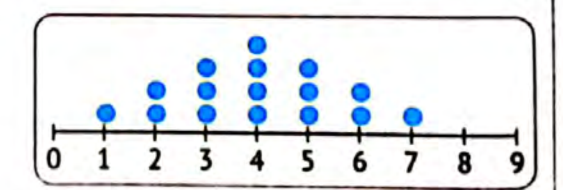
(no mode or one mode or two modes or three modes)

b) The correct description that applies to opposite graph is that the mean ....



(increases or decreases or remains the same)

c) .... will be the best choice as a measure of the center in the opposite graph.



(The mean or The median or The mode or Both mean and median)

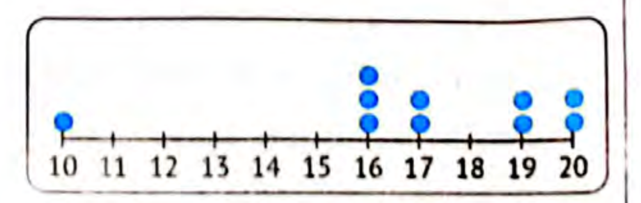
3 Answer using the corresponding graph:

a) Mean: ....

b) Median: ....

c) Mode: ....

d) Outliers: ....

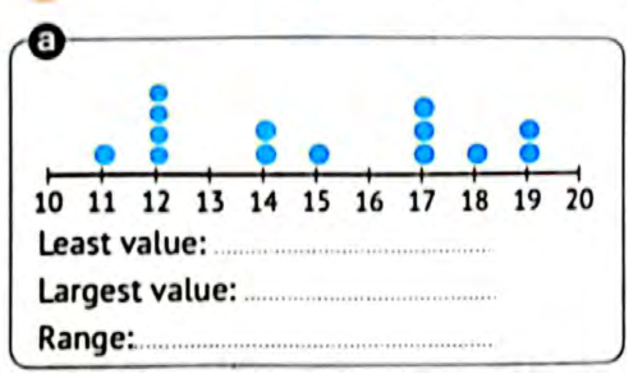


Lesson 4 Exploring the Range

1 Find the range for each of the following set of values:

	Values	Range
a	45, 25, 13, 30, 35	....
b	11, 45, 17, 25, 13	....
c	6, 2, 7, 7, 5, 3	....
d	9, 2, 7, 6, 3, 4, 9	....
e	15, 36, 70, 25, 12	....
f	7, 9, 2, 7, 2, 7, 2, 5	....
g	66, 25, 66, 15, 66	....

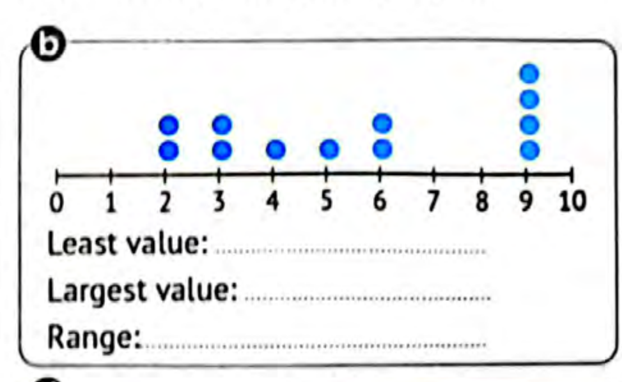
2 Find the range using each of the following dot plot graphs:

a


Least value: ....

Largest value: ....

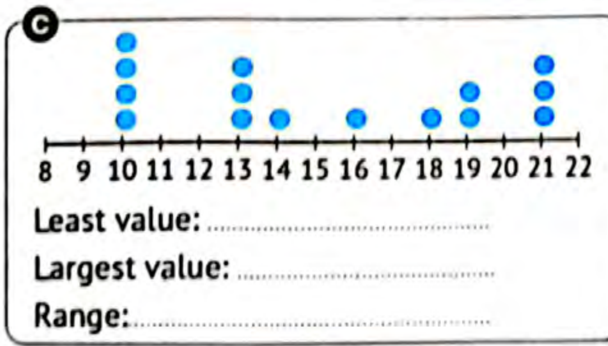
Range: ....

b


Least value: ....

Largest value: ....

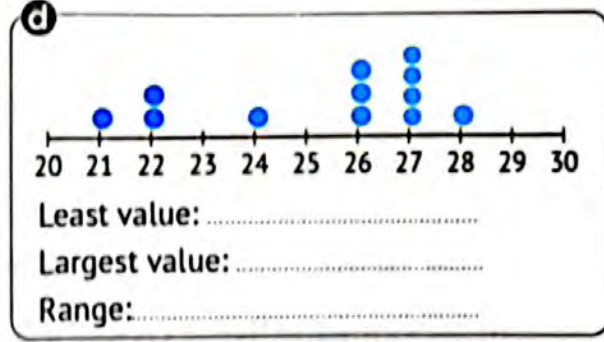
Range: ....

c


Least value: ....

Largest value: ....

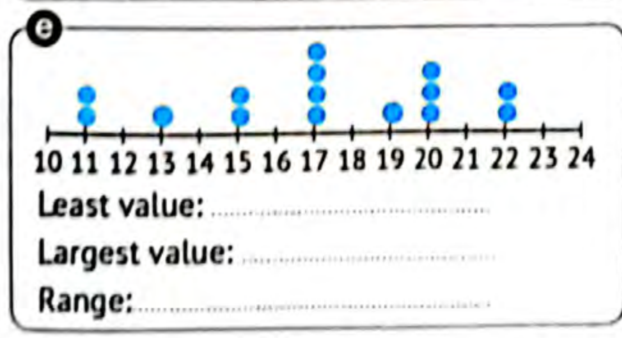
Range: ....

d


Least value: ....

Largest value: ....

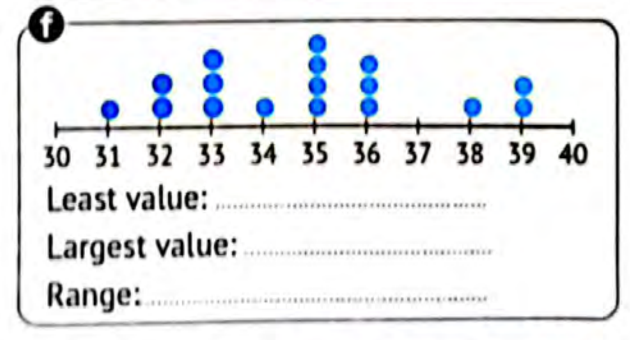
Range: ....

e


Least value: ....

Largest value: ....

Range: ....

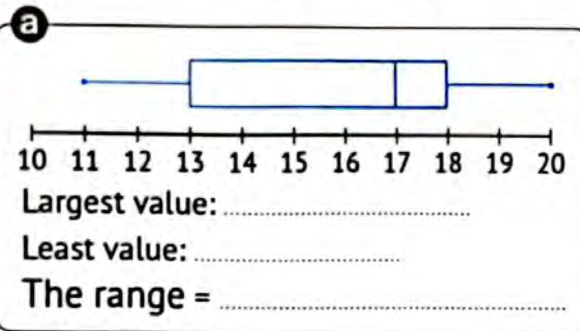
f


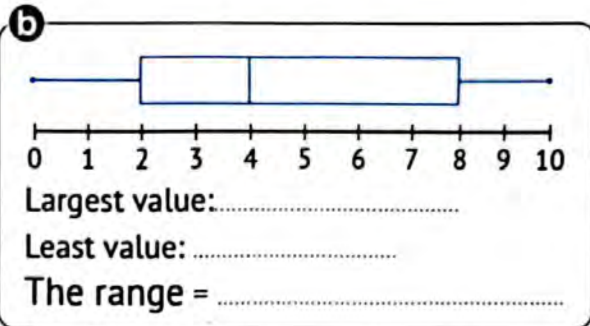
Least value: ....

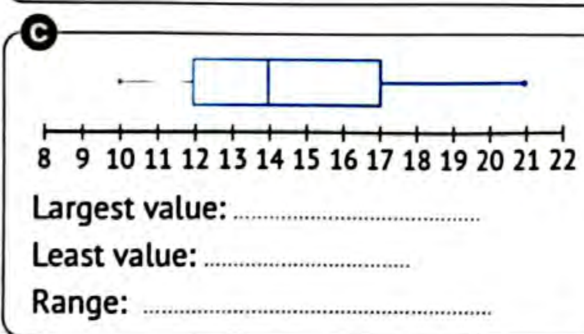
Largest value: ....

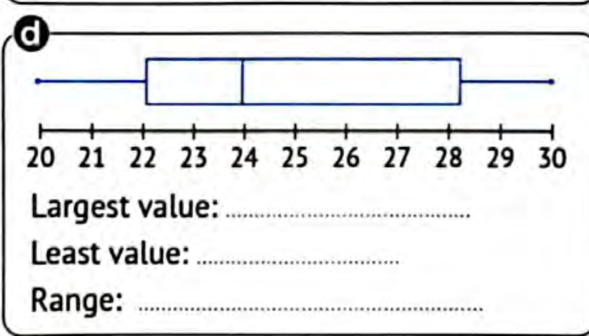
Range: ....

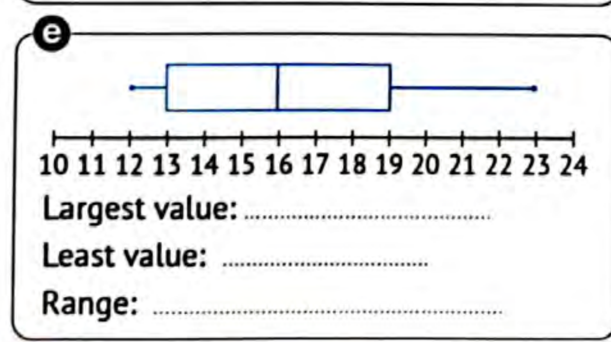
3 Find the range using each of the following box plot:

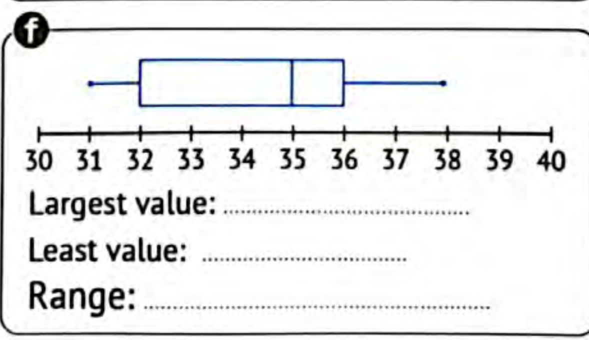












4 Find the range in each of the following:

a The following table shows the ages of a group of friends:

Name	Majed	Tawfiq	Rami	Malik	Mahmoud
Ages	15	11	18	13	14

Largest value: .... Least value: .... Range: ....

b The following table shows the amounts saved by Lamia over the past 5 months:

Month	First	Second	Third	Fourth	Fifth
The amount in pounds	120	135	200	85	115

Largest value: .... Least value: .... Range: ....

ⓒ The following table shows the number of visitors to an exhibition for 5 days:

Day	Sunday	Monday	Tuesday	Wednesday	Thursday
Number of visitors	1,200	2,000	3,400	3,000	3,600

Least value: .... Largest value: ....

Range: ....

ⓓ The following table shows the number of students in each class in a school:

Class	First	Second	Third	Fourth	Fifth	Sixth
Number of students	280	275	250	260	224	215

Least value: .... Largest value: ....

Range: ....

5 Complete the following

ⓐ Range = ... − ....

ⓑ It is easier to find the range using a .... or ....

ⓒ The range cannot be found using ....

ⓓ The range for the values "9, 2, 4, 1, 8, 5" is ....

ⓔ If the largest value is 15, and the least value is 3, then the range = ...

ⓕ If the range of a set of values is 12 and the smallest value is 5, then the largest value is ....

ⓖ If the range of a set of values is 25 and the largest value is 52, then the smallest value is ....

ⓗ Range .... by outliers in the data set (affected, unaffected).

ⓘ It is easier to find the range using a dot plot or box plot because each of them explains ....

ⓙ The range is a measure of ....

Assessment 3 on Lesson 4

Unit 7

1 Complete the following:

ⓐ .... is the difference between the highest value and the lowest value.

ⓑ The range for the values "3, 7, 9, 5, 8, 7" is ....

ⓒ If the range of a set of values is 15 and the largest value is 36, then the smallest value is ....

ⓓ It is easier to find the range using a dot plot or box plot. because each of them explains .... and ....

2 Choose the correct answer:

ⓐ If the largest value is 18 and the least value is 6, then the range ισ ....
(12 or 24 or 3 or 78)

ⓑ If the range of a set of values is 11 and the smallest value is 7, then the largest value is .... (4 or 18 or 77 or 70)

ⓒ All of the following are measures of the central tendency, except ....
(mean or median or mode or range)

ⓓ The range cannot be found using the ....
(dot plot or box plot or histogram or bar chart)

3 The following dot plot shows the total points Jalal scored in each basketball game this season, complete:

The Total points

10 12 14 16 18 20 22 24 26 28 30

Points

ⓐ Least value: ....

ⓑ Largest value: ....

ⓒ Range: ....

ⓓ The Mean: ....

ⓔ The Median: ....

ⓕ The Mode: ....

1 Assessments on Units

Assessment on Unit 1



First: **Choose the correct answer:**

a) If $12 \times 34 = 408$, then $408 \div 12 =$ .... (12 or 34 or 408 or 36)

b) If $574 = 41 \times 14$, then $580 \div 41 = 14$, and the remainder is ....

(14 or 41 or 6 or 16)

c) A number that, if divided by 8, the quotient will be 16, and the remainder is 3. (131 or 128 or 19 or 24)

d) .... is a factor of all numbers. (0 or 1 or 2 or 3)

e) 7, 5, 3, and 2 are .... numbers. (even or odd or prime or otherwise)

f) The greatest common factor of any two prime numbers is ....

(0 or 1 or their sum or their product)

g) The least common multiple of two prime numbers is ....

(the greatest number or 1 or their sum or their product)

h) $6 \times (7 + 5) =$ ....

($(6 \times 7) + (6 \times 5)$ or $6 \times 7 + 5$ or $6 \times 7 \times 5$ or $(6 + 7) \times (6 + 5)$)

i) $(2 X 8) + (2 X 3) =$ ....

($2 \times 8 \times 3$ or $2 + (8 \times 3)$ or $2 \times (8 + 3)$ or $2 \times 8 \times 2 \times 3$)

j) $1\frac{3}{4} + 2\frac{1}{2} =$ .... ($4\frac{1}{4}$ or $3\frac{1}{4}$ or $3\frac{4}{6}$ or 4)

Second: **Complete the following:**

a) If $1{,}050 \div 12 = 87$, and the remainder is 6, then $12 \times 87 =$ ....

b) If $351 \div 27 = 13$, then $13 \times 27 =$ ....

c) The prime number has .... factor(s).

ⓓ All prime numbers are odd numbers, except .... is an even number.

ⓔ .... is the smallest prime number.

ⓕ Any two numbers are relatively prime numbers if their greatest common factor is ....

ⓖ The least common multiple of any two prime numbers is ....

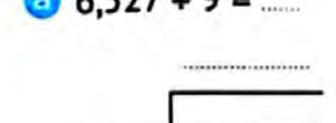
ⓗ 8 × (2 + 7) = (...... × ......) + (...... × ......)

ⓘ $3\frac{1}{5}$ + ... = $5\frac{1}{2}$

Third: Answer the following:

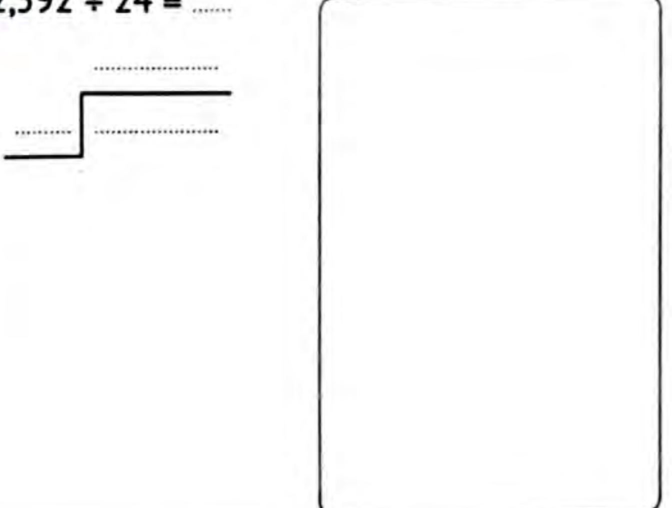
1 Find the result:

ⓐ 6,527 ÷ 9 = ...



ⓑ 2,592 ÷ 24 = ...





ⓒ $5\frac{3}{8} + 2\frac{5}{6}$ = ...

ⓓ $7\frac{1}{4} - 3\frac{3}{5}$ = ...

2 A compound consists of 840 housing units, each building within this compound consists of 15 housing units.

How many buildings in this compound?

....

d) The smallest positive integer is ....

e) The number and its opposite have the .... distance from zero, but in two .... directions on a number line.

f) The rational number "-7.2" lies between the two integers .... and ....

g) All natural numbers are .... numbers and .... numbers.

h) The rational number $-\frac{3}{2}$ in the decimal form is ....

i) If $|a| = 8$, then a = ... or ....

j) If $|5.6| = n$, then n = ...

Third:

1 **Complete using (<, =, or >):**

a) -3.8 ☐ -1.8

b) $|-2.5|$ ☐ $|-3.6|$

c) $\left|\frac{2}{5}\right|$ ☐ $|-0.4|$

d) $-3\frac{7}{8}$ ☐ $\left|-3\frac{5}{8}\right|$

2 **Arrange the following numbers in a descending order:**

0.55 , $-\frac{3}{5}$, $\left|-\frac{1}{2}\right|$, $-\frac{1}{4}$, $|0.8|$

.... , ... , ... , ... , ...

Accumulative Assessments on Units 1 – 2

Assessment 1

First: Choose the correct answer:

(a) If 6,688 = 19 × 352, then 6,694 ÷ 19 = 352, and the remainder is ....
(14 or 41 or 6 or 16)

(b) The greatest common multiple of 9 and 8 is .... (9 or 8 or 1 or 72)

(c) The prime factors of 20 are ....
(2 x 10 or 5 x 4 or 2 x 2 x 5 or 1 x 20)

(d) All negative numbers are .... zero. (< or = or > or ≥)

(e) –25 ☐ –12 (< or = or > or ≥)

Second: Complete the following:

(a) 6 × (7 + 5) = (...... × ......) + (...... × ......)

(b) .... comes just before –1.

(c) .... is the opposite number of "10".

(d) The integer that expresses (The value of the loss is 20 LE) is ....

(e) If 7 = | a |, then a = ... or ....

Third: Answer the following:

(a) If the total price of 25 books is 2,825 pounds, then what is the price of one book?

....

(b) Ahmed wants to plant 45 sunflower plants and 81 corn plants in his garden. If he put the same number of plants in each row, what is the greatest number of rows can he make?

....
....
....

...... = ...
...... = ...
GCF = ...

Assessment 2

First: Choose the correct answer:

a) The rational number represented on the corresponding number line is ....

-8 -7 -6 -5 -4 -3

$\left(4\frac{2}{2} \text{ or } 5\frac{2}{3} \text{ or } -4\frac{2}{3} \text{ or } -5\frac{2}{3}\right)$

b) 12 and .... are relatively prime numbers. (16 or 15 or 35 or 20)

c) The opposite of 6 > .... (−5 or 5 or −7 or 7)

d) $\frac{3}{5}$ ☐ $-\frac{5}{3}$ (> or = or < or ≥)

e) – 4 is to the right of .... on the number line. (−5 or 5 or −3 or 3)

Second: Complete the following:

a) The additive inverse of .... is itself.

b) $-\frac{5}{4}$ = ... (In the decimal form)

c) .... × (...... + ...) = (2 × 8) + (2 × 6)

d) .... is a number whose prime factors are 3, 2, 7.

e) $3\frac{1}{5}$ + ... $= 8\frac{1}{2}$

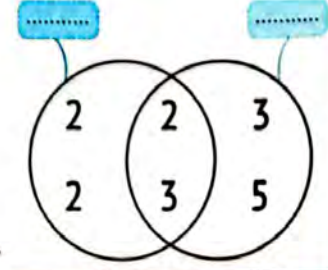
Third: Answer the following:

1 Find the results :

a) $3\frac{5}{8} + 4\frac{1}{6}$ = ...

b) $4\frac{1}{2} - 1\frac{3}{4}$ = ...

2 Complete the following using the opposite Venn diagram.



a) The two numbers are .... and ....

b) The GCF is ....

c) The LCM is ....

Assessment on Unit 3

First: **Choose the correct answer:**

a) The algebraic term "5ab" is from .... factors. (1 or 2 or 3 or 4)

b) The number of terms that makes up the algebraic expression "$3xy + 2x - 5$" is .... term. (2 or 3 or 4 or 5)

c) The absolute term in " 3m + 2" is .... (2 or 3 or m or 3 m)

d) Subtracting the number 3 from twice the number y = ...
(3 – 2y or 2 (y – 3) or 3y – 2 or 2y – 3)

e) Samah is now 25 years old. How old was she h years ago?
(25 – h or h – 25 or 25 – h or 25h)

f) $5 \times 5 \times 5 =$ .... (5×3 or 5^3 or 3^5 or $5 + 3$)

g) $3^2 + 4$ ..... $9 + 2^2$ (> or = or < or ≤)

h) If the price of one book is 15 pounds, what is the price of b number of books? (15 b or 15 – b or b – 15 or b + 15)

i) The value of $(12 - x^3) \div 2$ if $x = 2$ is .... (8 or 10 or 2 or 6)

j) The order that is used to find the value of $2 + 3(m^2 - 5)$ if m = 3 is ....
(putting exponents in their simplest form, subtraction, multiplication, addition
or addition, exponents, subtraction, multiplication
or putting the exponents in the simplest form, addition, subtraction, multiplication
or multiplication, addition, exponents in simplest form, subtraction)

Second: **Complete the following:**

a) If the sum of two integers is S and one of them is 10, then the other number is ....

b) In $7xy$, the coefficient is ....

c) Like terms for "3n + 3 + 2n" are ....

d) Twice of subtracting 5 from the number w = ...

(e) The verbal form for "$3x - 5$" is ....

....

(f) Ahmed's car consumes "n" liters of fuel to travel a distance of 100 km. How many liters does the car need to travel a distance of 600 km? ....

(g) The value of "$4 \times (y^3 - 7)$" If $y = 3$ is ....

(h) $3 \times 3 \times 3 \times 3 \times 3 \times 3 = ...^{.......}$

(i) $5^{.......} = 1$ (j) $4^{.......} = 4$

Third: Answer the following:

1 Moataz saved "n" pounds per day for 9 days, then he got 20 pounds from his father.

(a) Write an algebraic expression that expresses the amount that Moataz has now: ....

(b) Complete using the preceding algebraic expression:

① The number of terms of an algebraic expression is ....

② The coefficients are ....

③ The constants are ....

2 Find the value of each of the following two algebraic expressions using the numbers shown, then indicate if these expressions are equivalent or not :

	$2x + 1$	$5x - 4$	Equal or Not?
If $x = 5$			
If $x = 3$			

From the previous table, we find that the two algebraic expressions are .... (Equivalent or Not).

Accumulative Assessments on Units 1 – 3

Assessment 1

First: Choose the correct answer:

a) A number that, if divided by 9, the quotient is 15, and the remainder is 3, is .... (135 or 128 or 138 or 27)

b) .... is the opposite of -12 (−12 or 12 or 1 or 2)

c) The algebraic term "$\frac{3}{4}x$" has .... a factor. (1 or 2 or 3 or 4)

d) If we subtract 9 from the number x , the result is ....

($x + 9$ or $x - 9$ or $9 - x$ or $9x$)

e) 1^5 = ... (1×5 or $1 + 5$ or 1 or 0)

Second: Complete the following:

a) If 2,000 ÷ 51 = 39 and the remainder is 11, then 51 × 39 = ...

b) The absolute term in the algebraic expression "5b + 3.2" is ....

c) A number whose prime factors are 2, 3, 5 is ....

d) Salah saves Z pounds per day. How much does he save in a week? ....

e) In .... 4 is called the base and 2 is called the exponent.

Third: Answer the following:

a) Find the value of "4a – 15 ÷ 3" [If a × 2.5]

....

....

b) Arrange the following numbers in a descending order:

$0.8 \; , \; -\frac{1}{5} \; , \; \frac{1}{2} \; , \; -\frac{3}{4} \; , \; |-0.25|$

The order: .... , ... , ... , ... , ...

c) Bassem runs one kilometer in 15 minutes.

Write a mathematical expression that expresses the number of kilometers that Bassem runs in " t " minutes.

....

Assessment 2

First: Choose the correct answer:

a. If 36 × 28 = 1,008, then 1,008 ÷ 28 = ... (12 or 34 or 408 or 36)

b. In "–8 a" the algebraic factor is .... (a or 8 or 8a or - 8)

c. | – 3.7 | = ... (3.7 or –3.7 or 37 or –37)

d. 2 × 2 × 2 = ... (2^3 or 3^2 or 2 × 3 or 2 + 3)

e. $2^3 + 2^3$ = ... (2^6 or 4^3 or 2^4 or 4^6)

Second: Complete the following:

a. .... is the smallest prime number.

b. The smallest positive integer is ....

c. The number of terms in the algebraic expression 5y – 25 z is ....

d. If the price of a pen is 8 LE then the price of x pens is ....

e. The verbal form for the algebraic expression 3b + 4 is ....

....

Third: Answer the following:

1. Follow the order of performing operations to find:

a. $4^2 + (2^4 - 7) \times 2$

= ....

= ....

= ....

b. $(2^3 + 6) \div (3^2 - 2)$

= ....

= ....

= ....

2. Wael collected $3\frac{3}{4}$ kilograms of dates and gave $2\frac{1}{5}$ kilograms to his friend.

How many kilograms are left with Wael?

....

Assessment on Unit 4



First: Choose the correct answer:

ⓐ If a + 3 = 7, then a = ... (7 or 3 or 10 or 4)

ⓑ If b = 6, then b − .... = 2. (4 or 8 or 2 or 3)

ⓒ If 5 x = 40, then x = ... (35 or 45 or 8 or 200)

ⓓ If y = 6, then $\frac{y}{\ldots}$ = 2. (3 or 8 or 12 or 4)

ⓔ The inequality that represents all values "greater than 4" is ....

($x > 4$ or $x < 4$ or $x \leq 4$ or $x \geq 4$)

ⓕ The inequality that represents all values "less than or equal to −2" is ....

($x > -2$ or $x < -2$ or $x \leq -2$ or $x \geq -2$)

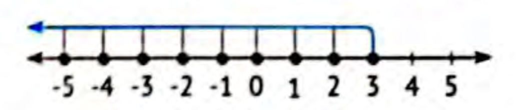
ⓖ The inequality that represents all negative numbers are ....

($x > 0$ or $x < 0$ or $x \leq 0$ or $x \geq 0$)

ⓗ Which of the following is a solution to the inequality $x < -6$?

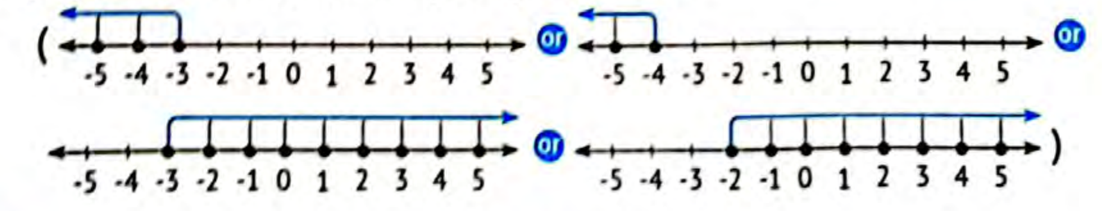
(5 or −5 or −7 or 7)

ⓘ The inequality represented by the corresponding graph is ....



($x > 4$ or $x < 4$ or $x \leq 4$ or $x \geq 4$)

ⓙ The graph expressing the inequality "$x < -3$" is ....



Second: Complete all of the following:

ⓐ If $x + 7 = 9$, then x = ...

ⓑ If 4 m = 20, then m = ...

ⓒ If b = 12, then b − .... = 8.

ⓓ If d = 3, then .... × d = 18.

e) If k = 6, then 2 = ... + k.



f) The equation that represents the corresponding model is ....

g) The inequality that represents all values "less than −6" is ....

h) The inequality that represents all values "greater than or equal to 3" is ....

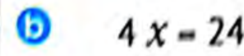
i) The inequality tht represents all positive integers are ....

j) The similarities between the graphs of the two algebraic expressions $x = 9$ and $x \geq 9$ are ....

Third: Answer the following:

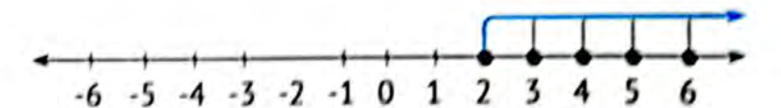
1. Find the value of the variable in each of the following equations:

a) $x - 5 = 4$	b) $4x = 24$
=	= ....
=	= ....

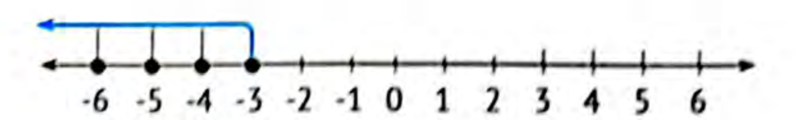


2. Use the following number line to write inequalities:

a)  ....



b)  ....



Accumulative Assessments on Units 1 – 4

Assessment 1

First: **Choose the correct answer:**

ⓐ .... is a factor of all numbers. (0 or 1 or 2 or 3)

ⓑ The number –3 is located to the right of the number ....
on the number line. (–4 or 4 or –2 or 2)

ⓒ In the algebraic term "–5 a b" the coefficient is ....
(a or b or 5 or –5)

ⓓ If $5x = 15$, then $3x =$ .... (3 or 12 or 9 or 15)

ⓔ Which of the following is a solution to the inequality "$x > -2$" ?
(–5 or –3 or –2 or 0)

Second: **Complete the following:**

ⓐ .... is the smallest prime number.

ⓑ If b = I –7 I, then b = ...

ⓒ Ahmed is now "y" years old, how old was he 3 years ago? ....

ⓓ If b = 6, then b + ... = 8.

ⓔ The inequality that represents all values greater than or equal to –8 is .... .

Third: **Answer the following:**

Write the equation that represents each of the following models, then find the value of x:

ⓐ



Equation: ....

$x =$ ....

ⓑ



Equation: ....

$x =$ ....

Assessment 2

First: Choose the correct answer:

a) The least common multiple of any two prime numbers is ....
(the greater number or 1 or their sum or their product)

b) The integer that expresses (The depth of a well of 8 meters) is ....
(-8 or 8 or $\frac{1}{8}$ or $-\frac{1}{8}$)

c) The number of terms that make up the algebraic expression "5 + 2 a b" is ....
(2 or 3 or 4 or 5)

d) If Basim is "x" years old now, how old will he be after 5 years? ....
($x - 5$ or $x + 5$ or $5 \div x$ or $5x$)

e) If "a + 3 = 7", then 2 a = ...
(10 or 4 or 8 or 20)

Second: Complete the following:

a) The LCM of the two relatively prime numbers is ....

b) $8 \times (\ldots + \ldots) = (\ldots \times 9) + (\ldots \times 2)$

c) The number "-3" is the opposite of the number ....

d) The absolute term in the algebraic expression $7x + 1$ is ....

e) The inequality that represents all values less than -6 is ....

Third: Answer the following:

1) A school has 604 boys and 521 girls, it is intended to divide the boys and girls equally into 25 classes in the school.
How many students will be in each class?

....

....

2) Solve each of the following equations:

a) $x - 4 = 8$

= ....

= ....

b) $3y = 24$



= ....

= ....

Assessment on Unit 5

First: **Choose the correct answer:**

a) In the equation "a = 3 b", the independent variable is ....

(a or b or 3 or 3b)

b) In the equation "m + 5 = r", the dependent variable is ....

(m or 5 or r or 5m)

c) If the independent variable is the number of studying hours, then the dependent variable is the .... (exam result or school uniform color or means of access to school or number of class students)

d) If the dependent variable is the number of training hours, then the independent variable is .... (the number of days you go to the club or the distance between the club and the house or the color of your training clothes or the height of the house)

e) The equation that expresses the relationship "subtract from 6" is ....

($y = x - 6$ or $y = 6 - x$ or $y - x = 6$ or $y = 6x$)

f) The equation that expresses the relationship "add 5 then multiply by 2" is .... ($y = 2x + 5$ or $y = 2(x + 5)$ or $y = 5x + 2$ or $y = (x + 2) \times 5$)

g) The relation that represents the equation "$y = (x - 8) \div 3$" is ....

(divide by 8, then subtract 3 or subtract 8, then divide by 3 or divide by 3, then subtract 8 or subtract 3, then divide by 8)

h) If $y = 2x + 3$, $x = 2.5$ then $y =$ .... (5 or 11 or 8 or 5.5)

i) If $y = 2(x + 4)$, $x = 5$, then $y =$ .... (11 or 29 or 18 or 14)

j) If $y = 5x - 8$, $x = 8$, then $y =$ .... (32 or 2 or 30 or 12)

Second: Complete the following:

a) In the equation "8 a = b" the independent variable is ....

b) If the number of cars in the garage depends on the size of the garage, then:

[1] the independent variable is ....

[2] the dependent variable is ....

c) If the independent variable is what Ahmed saves every day and the dependent variable is what he saves in one week, then .... depends on ....

d) If the rule is "add 2.4", then

[1] the equation is .... [2] if x = 4, then y = ...

e) If the rule is "divide by 4" then

[1] the equation is .... [2] if x = 16, then y = ...

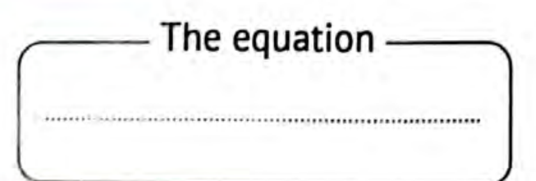
f) If the equation is $y = (15 + x) \div 4$, then :

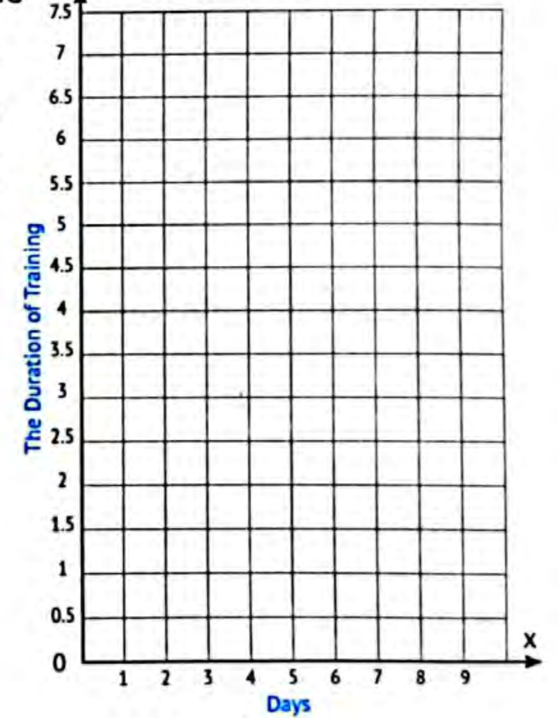
[1] the rule is .... [2] if x = 5, then y = ...

Third: Sameh trains for 6 hours divided into 4 days equally:

Complete the following table, where the variable "x" represents the number of days, and the variable "y" represents the duration of training in hours. Write an equation that shows the relationship between the variables "x" and "y", and then represent it graphically.

x	1	2	3	4
Y	....	....	....	....





Accumulative Assessments on Units 1 – 5

Assessment 1

First: Choose the correct answer:

a) The GCF of 4 and 15 is .... (0 or 1 or 4 or 5)

b) The greatest non-negative integer is .... (1 or 0 or -1 or -2)

c) The integer that expresses: "Hossam moved three steps back" is ....
(-3 or 3 or $x + 3$ or $x - 3$)

d) If the side length of a square is s cm, then the perimeter of the square = ...
($s + 4$ or $s - 4$ or $4s$ or $s \div 4$)

e) If $3^x = 27$, then the value of x = ... (2 or 3 or 9 or 24)

Second: Complete the following:

a) $6^2 \div 3^2 \times 2 =$ ....

b) If $15 = 8 + a$, then $3a =$ ....

c) If $y = 2x + 4$, $x = 3$ then $y =$ ....

d) The inequality that represents all values "to the left of the number 2" on the number line is ....

e) The relationship that expresses the equation "$y = 5x$" is ....

Third: Answer the following:

[1] Diaa saves 150 pounds every month, so if the amount he saves in (x) months is (y) pounds, then:

a) The equation that represents this situation is ....

b) The independent variable is ....

c) The dependent variable is ....

d) What Diaa saves in a year is ....

[2] The owner of a juice shop owns 5,950 paper cups. If he uses them within 17 days equally, how many cups did he use every day?

....

Assessment 2

First: Choose the correct answer:

a) 8 and .... are relatively prime numbers. (6 or 15 or 20 or 12)

b) An integer between 2 and –2 is .... (–1 or –3 or 3 or –4)

c) The number m plus 18 and the result divided by 3 = ... $\left(m + \frac{18}{3} \text{ or } \frac{m}{3} + 18 \text{ or } 3 \div (m + 18) \text{ or } (m + 18) \div 3 \right)$

d) 3^4 = ... (4 × 4 × 4 or 3 × 3 × 3 × 3 or 3 × 4 or 3 + 4)

e) If y = 27 , then $\frac{y}{\ldots\ldots}$ = 9 (18 or 3 or 27 or 9)

Second: Complete the following:

a) Prime numbers less than 10 are ....

b) .... × (3 + 6) = (9 × ....) + (9 × ....)

c) Integers between -3 and 2 are ....

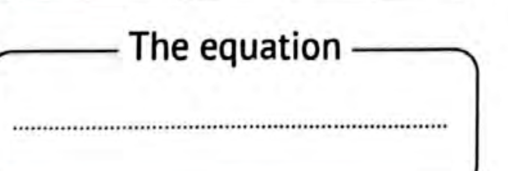
d) Opposite numbers on a number line have .... absolute values (same - different)

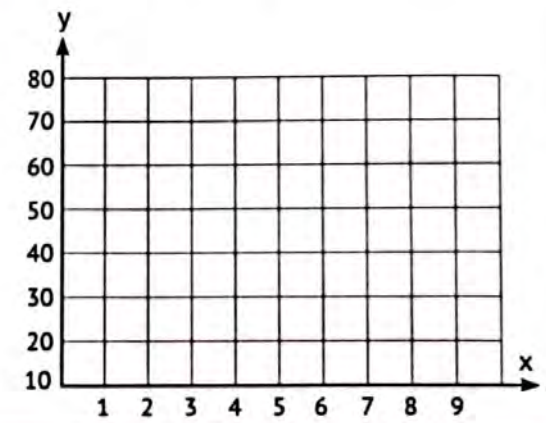
e) The value of the expression "$3 \times (y^2 - 5)$" when y = 3 is ....

Third: Answer the following:

Omar manufactures hats, producing 10 hats per day, the following table represents the number of working days (x) and the number of hats produced (y). Represent it graphically.

x	2	4	6	8
Y	20	40	60	80









First: **Choose the correct answer:**

a) Statistical question ....

(it results in a lot of different answers or has one answer or its answer is yes or no or its answer is one number)

b) From the categorical data ....

(birthdates or ages or weights or favorite colors)

c) From numerical data ....

(preferred colors or blood types or places of birth or ages)

d) All of the following data are categorical, except for ....

(favorite foods or jobs or weight or eye colors)

e) All of the following data are numerical, except ....

(temperatures or lengths or names or weights)

f) The horizontal axis includes numerical periods in a ....

(dot plot or bar graph or double bar graph or histogram)

g) A .... does not have a vertical axis.

(dot plot or bar graph or double bar graph or histogram)

h) In a .... there is a graduated scale for the vertical axis.

(dot plot only or bar graph only or both bar graph and histogram or histogram only)

i) The maximum value of the values 8, 6, 8, 7, 2, 6, 3 is ....

(2 or 7 or 8 or 6)

j) The upper quartile of the values 9, 3, 0, 4, 8, 1, 7 is ....

(9 or 4 or 1 or 8)

Second: Complete the following:

a) Types of questions are .... questions and .... questions.

b) Types of statistical data are .... data and .... data.

c) The monthly income of an institution's employees is from the .... data.

d) The number of letters of the first name of each student in the class, is from the .... data

e) The best graph to represent the number of pupils between the ages of 12 – 15 years is ....

f) The best graph to represent the number of studying hours for a student on Saturday is ....

g) The median of the values "9, 2, 8, 6" is ....

h) The minimum value of the values 2 , 9 , 1 , 1 , 8 , 5 is ....

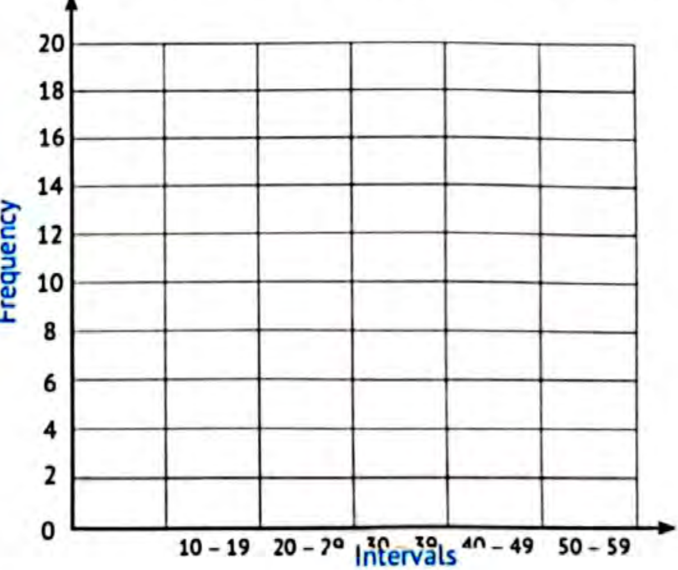
i) The most appropriate graph to represent individual data and the number of data values present is ....

j) The most appropriate graph to represent peaks and gaps and aggregate data is ....

Third: Answer the following:

1 Draw the histogram of the following data , which represent the scores of 50 students.

Interval Grades	Frequency Number of Students
10 – 19	4
20 – 29	12
30 – 39	18
40 – 49	9
50 – 59	8



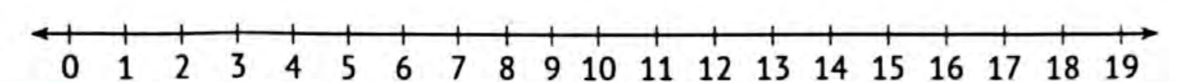
2 Draw the box plot for each of the following groups of values

(3 , 8 , 7 , 2 , 10 , 12 , 9 , 2 , 10 , 9).

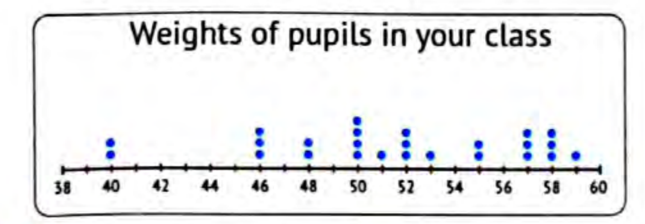
The order: ....

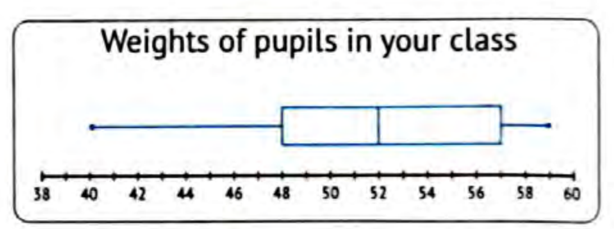
Minimum Value: .... Maximum Value: .... Median: ....

Upper Quartile: .... Lower Quartile: ....



3 The dots plot and the box plot below show the weights of a number of pupils in your class?





a Answer the following, explaining the best graph(s) that helps you in the answer.

	Question	Answer	Graph	
			Dot Plot	Box Plot
①	How many students weigh 57 kg?			
②	What is the median value?			
③	What is the height of the lightest pupil zone?			
④	What is the height of the heaviet students?			
⑤	How many students weigh more than 54 cm?			

b Write two questions that can be answered using:

Dot plot

① .... ② ....

Box plot

① .... ② ....

Accumulative Assessments on Units 1 – 6

Assessment 1

First: Choose the correct answer:

ⓐ The GCF of relatively prime numbers is ………………… .
(0 or 1 or their sum or their product)

ⓑ ……………… is neither a positive nor a negative number. (0 or 1 or -1 or 10)

ⓒ All integers are ………………… numbers.
(counting or natural or even or rational)

ⓓ The number of terms that make up the algebraic expression "$5x + 3y + 2$" is ………………… . (2 or 3 or 5 or 6)

ⓔ The inequality that represents all values less than or equal to -7 is ………………… . ($x > -7$ or $x < -7$ or $x \leq -7$ or $x \geq -7$)

Second: Complete the following:

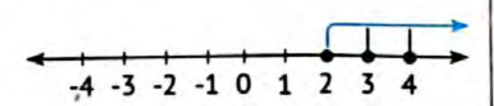
ⓐ ………………… to the power ………………… $= 6^4$

ⓑ If a meal costs 65 pounds, what is the price of "b" meals of the same type = ………………………………… .

ⓒ If $8m = 16$, then $2m + 3 =$ ………………… .

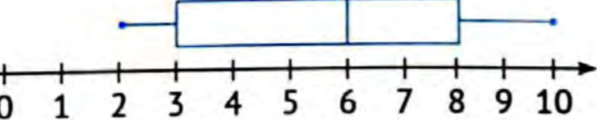
ⓓ The inequality that represents positive integers is ………………… .

ⓔ The inequality represented on opposite number line is ………………… .



Third: Answer the following:

1 Use the opposite box plot to find:



ⓐ Minimum Value: …………………

ⓑ Maximum Value: …………………

ⓒ Median: …………………

ⓓ Upper Quartile: …………………

ⓔ Lower Quartile: …………………

2 Find the value of each of the following:

ⓐ $d^3 + 7$ If [$d = 3$]
= ………………………………

ⓑ $37 - 4e$ If [$e = 2$]
= ………………………………

Assessment 2

First: Choose the correct answer:

ⓐ .... is a prime number. (55 or 11 or 22 or 33)

ⓑ $-\frac{7}{4} >$ .... ($\frac{7}{4}$ or $-1\frac{3}{4}$ or $\frac{8}{4}$ or $-\frac{8}{4}$)

ⓒ The number of terms of algebraic expression "8 + 3 x y" is ....

(2 or 3 or 4 or 5)

ⓓ The expression representing:

"half the difference between the number a and 7" is ....

($\frac{1}{2}a-7$ or $\frac{1}{2}a+7$ or $\frac{1}{2}(a-7)$ or $\frac{1}{2}(a+7)$)

ⓔ 5^0 .... 0^5 (< or = or > or ≥)

Second: Complete the following:

ⓐ Do you like the red color? is a .... question.

ⓑ The median of the values: 5, 7, 8, 3, 6 is ....

ⓒ .... is the only prime even number.

ⓓ The next number to 0 is ....

ⓔ Like terms in the algebraic expression "3 b + 5 a + 2 b + 5" are ....

Third: Answer the following:

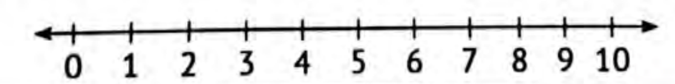
ⓐ A travel agency wants to divide 3,556 passengers using microbuses, each one has 14 seats. How many microbuses can the travel agency use?

....

....

ⓑ Draw the box plot for the following groups of values:

(5 , 8 , 3 , 2 , 8 , 6 , 4).



Assessment on Unit 7



First: **Choose the correct answer:**

a) If the mean of a set of values is 7 and the number of these values is 9, then the sum of the values is .... (16 or 63 or 2 or 9)

b) If the mean of a set of values is 8 and the sum of these values is 48, then the number of these values is equal to ....(6 or 40 or 56 or 8)

c) .... is not affected by outliers in the data set.

(The mean or The mode or The median or all of them)

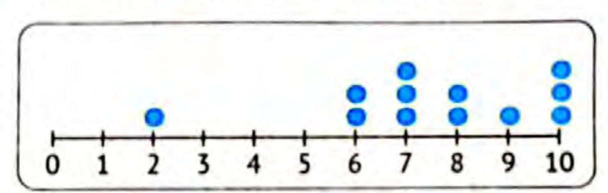
d) The range cannot be found using ....

(dot plot or histogram or box chart or all of them)

e) .... is one of the measures of variability (spread).

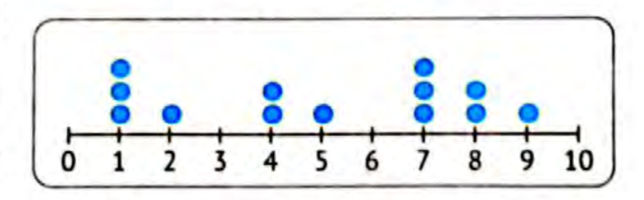
(The mean or The median or The mode or The range)

f) The correct description that applies to the opposite graph is the mean ....



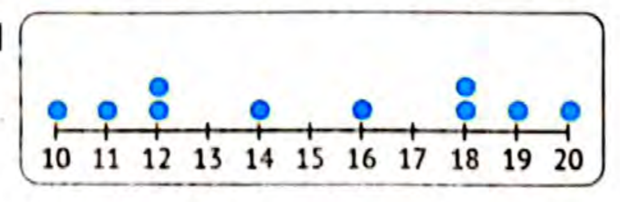
(increases or decreases or remains the same or The range)

g) The beast choice as a measure of central tendency for the values represented In the opposite graph is ....



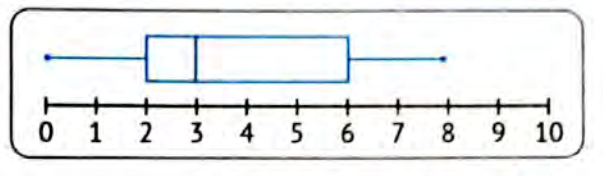
(the mean or the median or the mode or both the mean and the median)

h) The mean of the values represented by opposite dot plot graph is ....



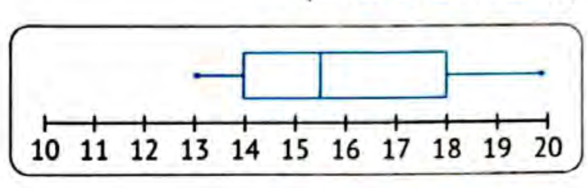
(15 or 20 or 14 or 16)

(i) The median of the values represented by opposite box plot graph is ....



(2 or 3 or 6 or 8)

(j) The range of values represented on the opposite box plot is ....



(4 or 18 or 5 or 7)

Second: **Answer the following:**

(a) The mean of the values: 9, 7, 3, 1, 8, 2 is ....

(b) The mode of the values 5, 3, 8, 7, 3, 5 is ....

(c) The range for the values: 15, 5, 17, 3, 12 is ....

(d) The outliers in the set of values: 5, 18, 3, 4, 7, 6 are ....

(e) .... and .... are affected by the presence of outliers.

Third: **Answer the following:**

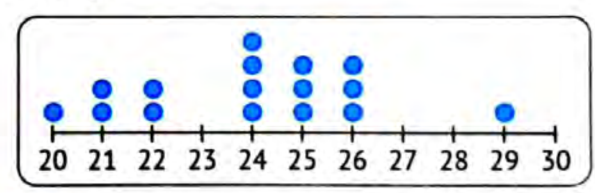
[1] Using the corresponding graph (answer).

(a) The Mean: ....

(b) The Median: ....

(c) The Mode: ....

(d) The Range: ....



(e) Outliers: ....

[2] The following table represents the temperatures recorded in a city in a week:

Day	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Temperature	26°	25°	30°	25°	23°	24°	22°

Using the values shown table, find:

(a) The Mean: ....

(b) The Median: ....

(c) The Mode: ....

(d) The Range: ....

(e) Outliers: ....

Accumulative Assessments on Units 1 – 7

Assessment 1

First: Choose the correct answer:

a) The GCF of 9 and 8 is .... (9 or 8 or 1 or 72)

b) $1\frac{3}{4} + 2\frac{1}{2} =$ .... $(4\frac{1}{4}$ or $3\frac{1}{4}$ or $3\frac{4}{6}$ or $4)$

c) The rational number $-2\frac{3}{4}$ is between the two whole numbers ....
(−1 , −2 or −2 , −3 or 1 , 2 or 2 , 3)

d) Twice the sum of 7 and x is ....
$(2x + 7$ or $2(x + 7)$ or $27 + x$ or $2(2x + 7))$

e) .... may uses separate columns to represent the data.
(Dot plots or Bar graph or Double bar graph or Histogram)

Second: Complete the following:

a) The smallest two-digit prime number is ....

b) The additive inverse of 5.9 is ....

c) The algebraic factor in the term "2.5 x" is ....

d) The inequality that represents all values "greater than −1" ....

e) $z + 5 = m$: independent variable is .... , dependent variable is ....

Third: Answer the following:

1. Use the following Box Plot to Complete:

a) Maximum Value: ....

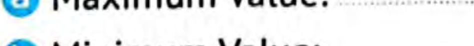
b) Minimum Value: ....

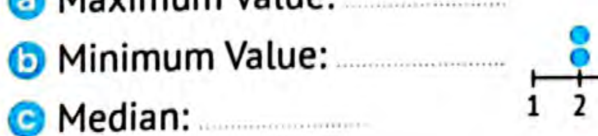
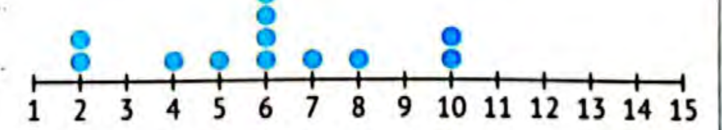
8 9 10 11 12 13 14 15 16 17 18 19 21 22

c) Median: .... d) Range: ....

2. Use the following Dot Plot to Complete:


a) Maximum Value: ....


b) Minimum Value: ....

c) Median: ....

d) Mean: .... e) Range: ....

Assessment 2

First: Choose the correct answer:

a $(2 \times 8) + (2 \times 3) =$ ....

$(2 \times 8 \times 3$ or $2 + (8 \times 3)$ or $2 \times (8 + 3)$ or $2 \times 8 \times 2 \times 3)$

b 5 is not a/an ....

(counting number or natural number or integer, or even number)

c $5 \times 3 + 2^2 =$ .... $(35$ or 19 or 51 or $17)$

d Which of the following values is a solution to the inequality "$x \geq 5$"? .... $(-5$ or 4.59 or -25 or $6)$

e .... are categorical data.

(Heights or Ages or Weights or Favourite colors)

Second: Complete the following:

a The prime number has only .... factor(s).

b The integer that expresses:

"the temperature is 15 below zero" is ....

c If $5 = |m|$, then $m =$ .... or ....

d The number of terms in the algebraic expression:

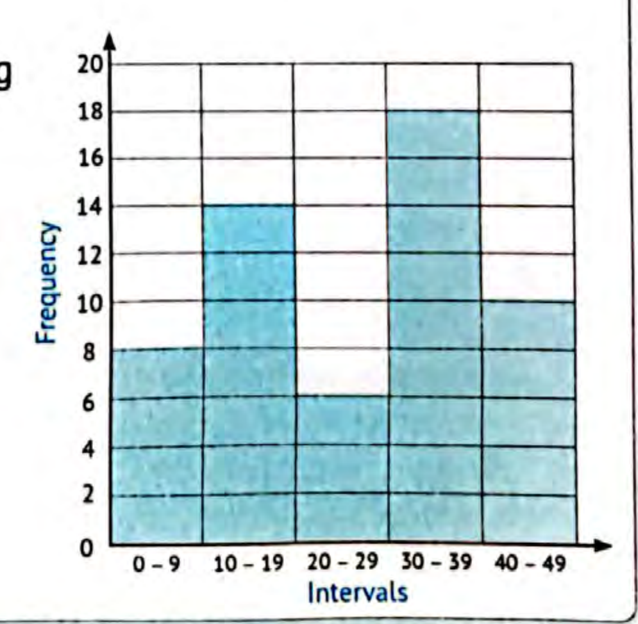
"$3x + 7y - 25$" is ....

e Categorical statistical data, written in the form of ....

Third: Answer the following:

1. Complete the following table using the opposite histogram:

Intervals	Frequency
0 – 9	....
10 – 19	....
20 – 29	....
30 – 39	....
40 – 49	....



2 Final Revision

First: **Choose the correct answer:**

1. If 15 × 27 = 405, then 405 ÷ 15 = ... (27 or 15 or 405 or 175)
2. If 2,054 = 26 × 79, then 2,060 ÷ 79 = 26, and the remainder is .... (14 or 41 or 6 or 16)
3. .... ÷ 11 = 14 R3 (158 or 157 or 156 or 154)
4. .... is a factor of all numbers. (0 or 1 or 2 or 3)
5. The prime number .... (has no factors or has only one factor or has two factors or has three factors)
6. The prime factors of 12 are .... (3 × 4 or 2 × 2 × 3 or 2 × 6 or 1 × 12)
7. If the prime factors of a number are 2 × 2 × 2, then the number is .... (8 or 4 or 6 or 222)
8. The LCM of any two prime numbers is .... (the smallest number or 1 or their sum or their product)
9. The LCM of of a relatively prime number is .... (the smallest number or 1 or their sum or their product)
10. The GCF of 4 and 15 is .... (0 or 1 or 4 or 5)
11. 6 and .... are relatively prime numbers. (4 or 15 or 35 or 20)
12. .... is a multiple of all numbers. (0 or 1 or 2 or 3)
13. .... is a prime number. (55 or 11 or 22 or 33)
14. 0, 6, 8, 2 are .... numbers. (even or odd or prime or counting)
15. The prime factors of 20 are .... (2 × 10 or 5 × 4 or 2 × 2 × 5 or 1 × 20)

16 If the prime factors of a number are $2 \times 3 \times 3$, then the number is ....

(18 or 9 or 11 or 233)

17 The greatest common factor of any two prime numbers is ....

(0 or 1 or their sum or their product)

18 The least common multiple of two prime numbers is ....

(smallest number or 1 or their sum or their product)

19 The least common multiple of a relatively prime number is ....

(greatest number or 1 or their sum or their product)

20 The least common multiple of 8 and 5 is ....

(8 or 5 or 13 or 40)

21 The greatest common factor of 6 and 25 is ....

(1 or 2 or 4 or 5)

22 8 and .... are relatively prime numbers.

(4 or 24 or 35 or 20)

23 12 and .... are relatively prime numbers.

(8 or 25 or 36 or 18)

24 The greatest common factor of a number whose prime factors are 2 and 5, and a number whose factors are 3 and 7 is ....

(0 or 10 or 1 or 210)

25 .... is a factor of all numbers. (0 or 1 or 2 or 3)

26 $6 \times (7 + 5) =$ ....

($(6 \times 7) + (6 \times 5)$ or $6 \times 7 + 5$ or $6 \times 7 \times 5$ or $(6 + 7) \times (6 + 5)$)

27 $(4 \times 9) + (4 \times 3) =$ ....

($4 \times 9 \times 3$ or $(4 \times 9) + 3$ or $4 + (9 \times 3)$ or $4 \times (9 + 3)$)

28 $1\frac{3}{4} + 2\frac{1}{4} =$ .... ($4\frac{1}{4}$ or $3\frac{1}{4}$ or $3\frac{4}{6}$ or 4)

29 -3 is located to the right of .... on the number line.

(−4 or 4 or −2 or 2)

30 The number that comes just before .... is -1. (−2 or 2 or 0 or 1)

31. $-9 >$ ...... (-15 or 8 or -8 or 10)

32. The opposite of -12 is .... (-12 or 12 or 1 or 2)

33. ...... is neither a positive nor a negative number. (0 or 1 or -1 or 10)

34. The opposite of $5 >$ ...... (-4 or 4 or -6 or 6)

35. The largest negative integer is .... (-1 or 1 or -100 or 0)

36. The largest non-positive integer is .... (-1 or 1 or -100 or 0)

37. All negative numbers ...... zero. ($<$ or $=$ or $>$ or $\leqslant$)

38. All positive numbers ...... zero. ($<$ or $=$ or $>$ or $\leqslant$)

39. The integer that expresses (the depth of a well of 5 meters) is ....
(-5 or 5 or -10 or 10)

40. An integer between 2 and -2 is .... (-1 or -3 or 3 or -4)

41. The number just after -9 is .... (-10 or -8 or 10 or 8)

42. -25 ...... -12 ($<$ or $=$ or $>$ or $\leqslant$)

43. $6 <$ ...... (-8 or 8 or -9 or -7)

44. -2.5 is a/an ......
(counting number or natural number or integer or rational number)

45. 5 is not a/an ....
(counting number or natural number or integer or even number)

46. 0 is a/an ...... number.
(counting or natural or negative integer or odd)

47. The opposite of $-\frac{3}{4}$ is .... ($\frac{3}{4}$ or $-\frac{4}{3}$ or $\frac{4}{3}$ or $1\frac{1}{3}$)

48. -6 in the form $\frac{a}{b}$ is .... ($-\frac{1}{6}$ or $-\frac{6}{1}$ or $\frac{1}{6}$ or $-\frac{6}{1}$)

49. Additive inverse of a number $\frac{3}{5}$ ...... $-\frac{5}{3}$ ($<$ or $=$ or $>$ or $\leqslant$)

50. $-\frac{7}{4} >$ ...... ($\frac{7}{4}$ or $-1\frac{3}{4}$ or $\frac{8}{4}$ or $-\frac{8}{4}$)

51. -2 is a/an ....
(counting number or natural number or negative integer or odd number)

52 All integers are .... numbers.

(counting or natural or even or rational)

53 The additive inverse of –5 is .... ($\frac{1}{5}$ or $-\frac{1}{5}$ or – 5 or 5)

54 Rational number $-2\frac{3}{5}$ is between ....

(– 1 , – 2 or – 2 , – 3 or 1 , 2 or 2 , 3)

55 –7 is to the right of .... on the number line.

(–8 or 8 or –6 or 6)

56 | –3.7 | = ... (3.7 or – 3.7 or 37 or – 37)

57 The absolute value of "zero" is .... (10 or 0 or –1 or 1)

58 The absolute value of 2.7 is .... (–2.7 or 2.7 or 27 or –27)

59 The larger the absolute value, the .... number zero.

(closer to or farther from or equal to)

60 The algebraic term "$\frac{1}{5}x$" has .... factors. (1 or 2 or 3 or 4)

61 In the algebraic term "– 3 x y" the coefficient is ....

(y or x or 3 or –3)

62 The algebraic factor in the algebraic term "$\frac{3}{8}x$" is ....

(x or 8 or 3 or $\frac{3}{8}$)

63 The number of terms of "7 a – 2 b" is .... (2 or 3 or 5 or 6)

64 Like terms for the algebraic expression "5 + 5 y + 2 y" are ....

(5 , 5 y or 5 y , 2 y or 5 , 2 y or 5 , 5y , 2y)

65 Like terms for the algebraic expression "2 + 3 b + 2 a" are ....

(2 , 3 b or 2 , 2 a or 3 b + 2 a or none)

66 In the algebraic expression "3 y + 9" the absolute term is ....

(9 or 3 or y or 3y)

67 If the height of the school building is "m" meters and the height of the tree adjacent to this building is 10 meters less than its height, then height of the tree is .... meters. (m + 10 or m – 10 or 10 m or $\frac{m}{10}$)

68 Ahmed and Tamer have 60 pounds, if what Ahmed has is "x" pounds, then what Tamer has is .... pounds

($60 + x$ or $60 - x$ or $60x$ or $60 \div x$)

69 If we subtract 5 from the number "x", the result is ....

($x + 5$ or $x - 5$ or $5 - x$ or $5x$)

70 The algebraic term is "5 ab" formed from .... factors.

(1 or 2 or 3 or 4)

71 Ziyad saved up "x" pounds and his father gave him 10 pounds so that he would be with him .... ($x - 10$ or $x + 10$ or $10x$ or $10 - x$)

72 The algebraic expression representing (subtracting 3 from twice the number "x")is .... ($x - 3$ or $2x - 3$ or $3x + 2$ or $5x$)

73 The algebraic expression representing (half the difference between the number "a" and 7) is ....

($\frac{1}{2}a - 7$ or $\frac{1}{2}a + 7$ or $\frac{1}{2}(a - 7)$ or $\frac{1}{2}(a + 7)$)

74 If Basim is "n" years old now, how old will he be after 7 years? ....

($n - 7$ or $n + 7$ or $7 \div n$ or $7n$)

75 Which of the following operations expresses the mathematical expression "double the number plus 4"? (+, − or x, − or x, + or x, ÷)

76 A square of side length "s" cm has a perimeter of .... cm.

($s + 4$ or $s \div 4$ or $s - 4$ or $4s$)

77 If the price of one book is 15 pounds, how much is the price of "b" number of books? ($15b$ or $15 - b$ or $b - 15$ or $b + 15$)

78 4^2 = ... (4×2 or 4×4 or $4 + 2$ or $4 + 4$)

79 3^0 = ... (3 or 0 or 1 or 3×0)

80 1^5 = ... (1×5 or $1 + 5$ or 1 or 0)

81 $2 \times 2 \times 2 \times 2 \times 2$ = ... (2^5 or 5^2 or 2×5 or $2 + 5$)

82 $4^{\cdots\cdots} = 1$ (0 or 1 or 2 or 5)

83 2^4 ☐ 4^2 (< or = or > or ≤)

84 7^0 ☐ 0^7 (< or = or > or ≤)

85 $5 \times 3 + 2^2 =$ .... (35 or 19 or 51 or 17)

86 $3^2 + 3^2 + 3^2 =$ .... (3^6 or 9^2 or 3^3 or 9^6)

87 If the price of one shirt is 120 Egyptian pounds, then the price of "m" number of shirts is .... (120 m or 120 ÷ m or 120 + m or 120 − m)

88 If Hanan saves "d" pound daily for 5 days, then her father gives her 20 pounds, so the amount that Hanan has now is ....

(5 + 20d or 20 − 5d or 5d + 20 or 5 × (d + 20))

89 The value of the expression $a^2 + 2 \times 3$, If $a = 3$ is ....

(15 or 33 or 12 or 24)

90 If $a + 8 = 15$, then $a =$ .... (7 or 15 or 8 or 23)

91 If $b = 6$, then $b -$ .... $= 4$ (10 or 4 or 2 or 6)

92 If $5x = 40$, then $x =$ .... (35 or 45 or 8 or 200)

93 If $y = 16$, then $\frac{y}{\cdots\cdots} = 2$. (3 or 8 or 12 or 4)

94 The inequality that represents all values "greater than −1" is ....

($x > -1$ or $x < -1$ or $x \leqslant -1$ or $x \geqslant -1$)

95 The inequality that represents all values to the left of 5 on the number line is .... ($x > 5$ or $x < 5$ or $x \leqslant 5$ or $x \geqslant 5$)

96 The inequality that represents all values "less than or equal to −7" is ....

($x > -7$ or $x < -7$ or $x \leqslant -7$ or $x \geqslant -7$)

97 The graph of the inequalities "$x > 3$" and "$x < 3$" on the number line are similar in that .... (3 doesn't belong to any of them

or both include all values to the left of the number 3

or there is a common point between them

or each of them includes all the values to the right of the number 3)

98 The graph of the inequalities " $x < 4$ " and " $x \leqslant 4$ " on the number line are similar in that ....

(4 doesn't belong to any of them or they include all values to the left of 4 or there is "a" common point between them or each of them includes all the values to the right of the number 4)

99 Which of the following values is a solution to the inequality " $x < 9$ "?

(10 or 9.1 or -9.5 or 9)

100 Which of the following values is a solution to the inequality " $x \geqslant 5$ "?

(-5 or 4.59 or -25 or 6)

101 The inequality for which all negative numbers are ....

($x > 0$ or $x < 0$ or $x \leqslant 0$ or $x \geqslant 0$)

102 In " $u = 3 \div w$ " the independent variable is .... (w or u or 3 or $\frac{w}{3}$)

103 In " $a = 5\ d$ ", the dependent variable is .... (5 or a or d or 5d)

104 If the amount of fuel consumed by the car depends on the distance traveled, then the independent variable is the ....

(fuel amount or distance traveled or traveled time or temperature)

105 If the dependent variable is the student's score in the exam, then the independent variable is ....

(the type of pen used in the solution or the age of the student or the number of correct answers or the number of questions in the exam)

106 The equation that expresses "subtract from 9" is ....

($y = x - 9$ or $y = 9 - x$ or $y - x = 9$ or $y = 9x$)

107 The equation that expresses "multiply by 2 and then add 5" is ....

($y = 5x + 2$ or $y = 2(x + 5)$ or $y = 5(x + 2)$ or $y = 2x + 5$)

108 The relation that represents the equation " $y = \frac{1}{3}\ x$ " is ....

(divide by 3 or multiply by 3 or divide by $\frac{1}{3}$ or subtract $\frac{1}{3}$)

109 The relation that represents the equation "$y = (x - 3) + 2$" is ....

(divide by 2, then subtract 3 or subtract 3, then divide by 2 or divide by 3, then subtract 2 or subtract 2, then divide by 3)

110 $y = 6x + 4$, If $x = 3$ then $y =$ .... (10 or 22 or 18 or 67)

111 $y = \frac{1}{4}x - 2$, If $x = 8$ then $y =$ .... (0 or 2 or 6 or 30)

112 Statistical question ....

(results in a lot of different answers or its answer is yes or no or has one answer or its answer is one number)

113 .... are categorical data.

(Dates of birth or Ages or Weights or Favorite colors)

114 .... are categorical data.

(Numbers of students in each class or Test scores or Numbers of family members or Favourite TV shows).

115 The horizontal axis includes numerical periods in ....

(dot plot or bar graph or double bar graph or histogram)

116 .... does not have a vertical axis.

(Dot plot or Bar graph or Double bar graph or Histogram)

117 .... uses separate columns to represent the data.

(Dot plot or Bar graph or Double bar graph or Histogram)

118 .... has horizontal axis.

(Bar graph or Double bar graph or Histogram or All of the previous)

119 In the dot plot, ...

(columns are used to represent data or there is no need for a horizontal axis or each value is represented by a point or data is displayed grouped in intervals)

120 In the bar graph ....

(each bar represents a number or one categorical data or it does not need a vertical axis or the bars must touched 0 or each piece of information is represented by a dot)

121 In the histogram ....

(it does not need a vertical axis or the bars must touch or data is shown above the number line or all bars are evenly spaced)

122 In each of the bar graphs and histograms ....

(bars are used to represent data or each bar represents an interval or each bar represents one number or The data is shown above the number line)

123 In the ...., there is a graduated scale for the vertical axis.

(dot plots only or bar graph only or histogram only or both of bar graph and histogram)

124 A .... may be used to display numerical data.

(dot plot or bar graph or histogram or all of the previous)

125 The best graph to represent the number of pupils whose height ranges from 150 – 160 cm is the ....

(dot plots or bar graph or histogram or all of the previous)

126 The best graph to represent the number of students absent on a Sunday is ....

(dot plots or bar graph or histogram or all of the previous)

127 A .... has two axes, horizontal and vertical.

(bar graph or double bar graph or histogram or all of the previous)

128 The bar graph .... (can display numerical and categorical data or can display only numerical data or can display only categorical data)

129 The mean of the values 45, 15, 40, 70, 80 is ....

(40 or 45 or 50 or 60)

130 If the mean of the values 12, 15, x, 8 is 10 then the value of "x" is ......

(40 or 5 or 20 or 10)

131 If the sum of 8 values equals 48, then the mean of these values is ......

(40 or 56 or 24 or 6)

132 If the sum of a set of values is 36, and the mean of these values is 6, then the number of these values is .... (6 or 42 or 30 or 216)

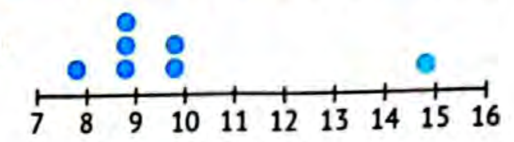
133 The median of the values: 4, 9, 7, 1, 1, 2 is .... (4 or 2 or 3 or 24)

134 If the mean of Manal and Siham's ages is 7 years, and Manal's age is 8 years, then Siham's age is .... years. (6 or 7 or 8 or 15)

135 Values "5, 3, 2, 5, 2, 7" has ....

(no mode or one mode or two modes or three modes)

136 The correct description that applies to opposite graph is the mean ....



(increases or decreases or remains the same)

137 .... will be the best choice as a measure of the centeral tendency in the opposite graph.

(The mean or The median or The mode or Both mean and median)

138 If the range of a set of values is 11 and the smallest value is 7, then the largest value is .... (4 or 18 or 77 or 70)

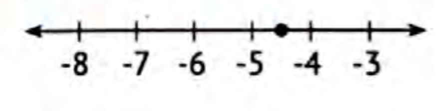
139 All of the following are measures of the center, except ....

(mean or median or mode or range)

140 The range cannot be found using ....

(dot plot or box plot or histogram or bar chart)

141 The rational number represented on the opposite number line is ....

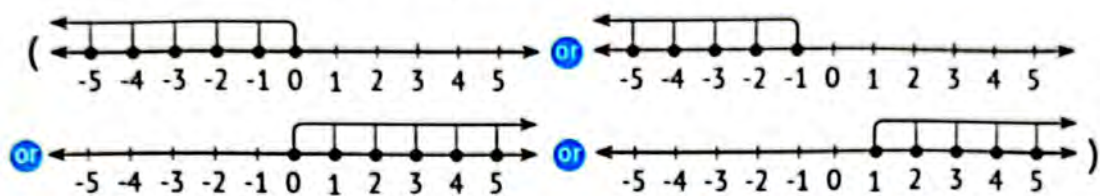


($4\frac{2}{3}$ or $5\frac{2}{3}$ or $-4\frac{2}{3}$ or $-5\frac{2}{3}$)

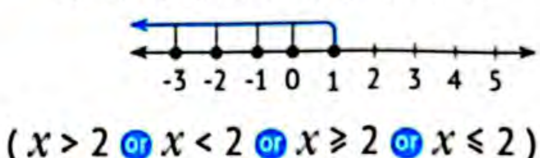
142 The rational number represented on the opposite number line is ....

(0.5 or -0.5 or 1.5 or - 1.5)

143 The graph representing the equation "$x < 0$" is ....



144 The inequality that represents the opposite model is ....



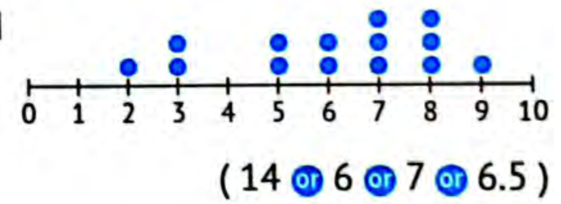
($x > 2$ or $x < 2$ or $x \geq 2$ or $x \leq 2$)

145 The equation that represents the opposite model is ....



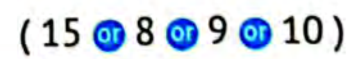
($x + 2 = 9$ or $2x = 9$ or $x - 2 = 9$ or $x \div 2 = 9$)

146 The mean of the values represented on the opposite dot plot is ....



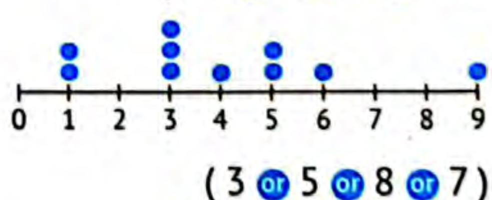
(14 or 6 or 7 or 6.5)

147 The median of the values represented on the opposite dot plot is ....



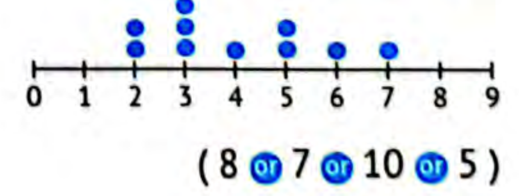
(15 or 8 or 9 or 10)

148 The mode of the values represented on the opposite dot plot is ....



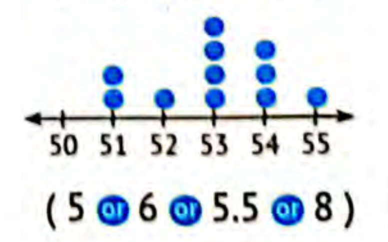
(3 or 5 or 8 or 7)

149 The range of the values represented on the opposite dot plot is ....



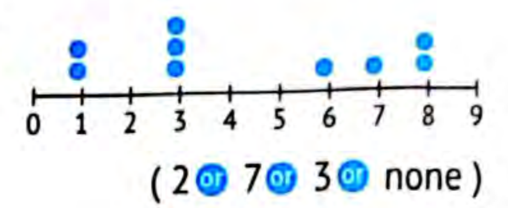
(8 or 7 or 10 or 5)

150 The mode of the values represented on the opposite dot plot is ....



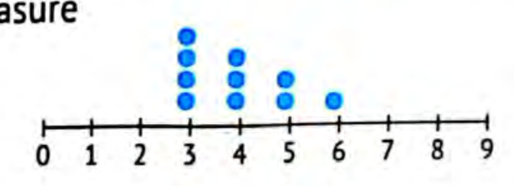
(5 or 6 or 5.5 or 8)

151 The outliers of the values represented on the opposite dot plot is ....



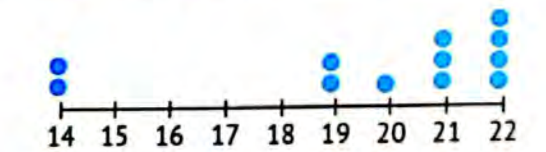
(2 or 7 or 3 or none)

152 .... will be the best choice as a measure of the centeral tendency in the opposite graph.



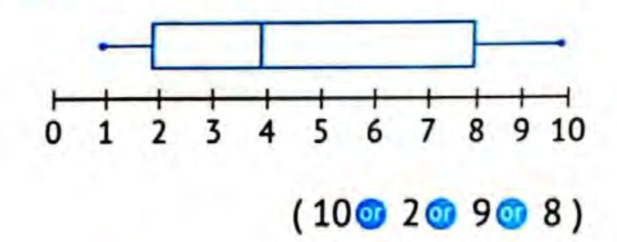
(Mean or Mode or Median or Range)

153 The correct description that applies on the opposite graph is the mean ....



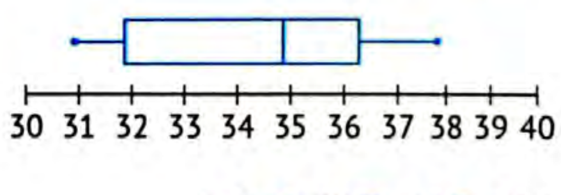
(increases or decreases or remains the same)

154 The range of the values represented on the opposite box plot is ....



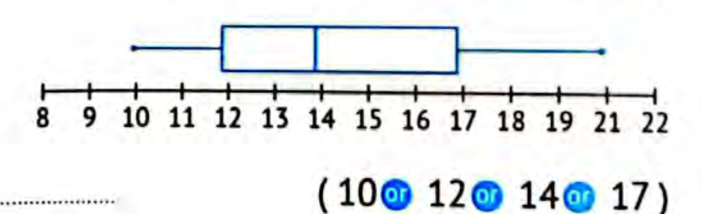
(10 or 2 or 9 or 8)

155 The median of the values represented on the opposite box plot is ....



(31 or 32 or 34 or 38)

156 The lower quartile of the values represented on the opposite box plot is ....



(10 or 12 or 14 or 17)

Second: Complete the following:

1. If $13 \times 48 = 624$, then $624 \div 13 =$ ....
2. If $976 = 61 \times 16$, then $985 \div 61 = 16$, and the remainder ....
3. If $2{,}000 \div 51 = 39$ and the remainder is 11, then $51 \times 39 =$ ....
4. The number that, if divided by 35, the quotient will be 139, and the remainder is 21, is ....
5. The prime number has .... only factors.
6. All prime numbers are odd numbers, except .... is an even.
7. .... is the smallest prime number.
8. .... is the smallest odd prime number.
9. The smallest two-digit prime number is ....
10. Prime numbers less than 10 are ....
11. .... is a number whose prime factors are 2, 5, 7
12. The GCF of the two relatively prime number is ....
13. The LCM of the two relatively prime number is ....
14. The .... number has only 2 factors.
15. All prime numbers are odd numbers, except .... is an even number.
16. .... is the only prime even number.
17. .... is a number greater than one, and it has only two factors.
18. The prime factors of 28 are ....
19. Two numbers are relatively prime if their greatest common factor is ....
20. The least common multiple of two prime numbers is ....
21. $5 \times (3 + 6) =$ (...... × ......) + (...... × ......)
22. ...... × (...... + ...) = (7 × 2) + (7 × 4)
23. 8 × (...... + ...) = (...... × 9) + (...... × 2)
24. ...... × (4 + 6) = (9 × ......) + (9 × ......)
25. The number and its opposite are on .... from zero, but on two .... sides on the number line.

26 The opposite of "10" is the number ....
27 The additive inverse of 8 is ....
28 The additive inverse of .... is itself.
29 The smallest number in counting numbers is ....
30 The smallest counting number is ....
31 The smallest natural number is ....
32 The smallest positive integer is ....
33 The greatest non-positive integer is ....
34 The greatest negative integer is ....
35 The smallest non-negative integer is ....
36 Integers between −3 and 2 are ....
37 5, 4, 3, 2, 1, 0, ...
38 −5, −4, −3, −2, ..., ..., ..., ...
39 Rational number $-\frac{3}{2}$ in the decimal form = ...
40 All counting numbers are also .... numbers, ... and .... numbers.
41 The next number to −8 is ....
42 The rational number "−7.2" lies between .... and ....
43 The rational number "−5.6" lies between .... and .... on the number line.
44 All natural numbers are .... numbers and .... numbers.
45 All integers are .... numbers.
46 −2.5 in the form $\frac{a}{b}$ is .... (in its simplest form).
47 The rational number $-\frac{7}{4}$ in the decimal form is ....
48 $|-5| =$ ....
49 $|\frac{7}{9}| =$ ....
50 $|-\frac{3}{4}| =$ ....

51 $|0.03|$ = ...

52 $|-0.7|$ = ...

53 If $5 = |a|$, then a = ... or ....

54 If $b = |-7|$, then b = ...

55 If $n = |9|$, then n = ...

56 $-|-4|$ = ...

57 $|9| + |-9|$ = ...

58 Opposite numbers on the number line have .... absolute values (equal - different).

59 The algebraic factor in "$2.5x$" is ....

60 The coefficient in the algebraic term "$3xy$" is ....

61 The number of terms in the algebraic expression $3xy - 25$ is ....

62 Like terms in the algebraic expression $6x + 6y + 2x + 6$ are ....

63 The absolute term in the algebraic expression $5b + 3.2$ is ....

64 The algebraic expression that expresses "three times b" is ....

65 The algebraic expression that expresses adding "z" to 36 is ....

66 The algebraic expression that expresses 5 less than "x" is ....

67 Baher has "m" stickers in the sticker book and then puts up 12 more stickers. So he has now ....

68 Two numbers their sum is 12, one of which is d, so the other number is (..........)

69 Salah saves "z" pounds per day. So he saves .... pounds in a week.

70 The verbal form for the algebraic expression $5a + 7$ is ....

71 If the side length of "a" square is "s" cm, then the perimeter of the square = ...

72 The value of the expression $9x$ if ($x = 5$) is ....

73 The value of the expression r^2 if ($r = 9$) is ....

74 The algebraic expressions "$2x + 3$" and "$2(x + 1)$" are .... expressions. (Equal, Not equal)

75 The value of the expression "$3(y^2 + 2)$ (if $y = 3$)" is ....

76 Two integers their sum is s, one of which is 10, then the other number is ....

77 In the algebraic term $7 \times y$, the coefficient is ....

78 Like terms for the algebraic expression $3n + 3 + 2n$ are ....

79 The algebraic expression that represents "twice of subtracting 5 from the number "w" is ....

80 The value of the algebraic expression $4 \times (y^3 - 7)$, If $y = 3$ is ....

81 In 5^7: 5 is called .... and 7 is called ....

82 In .... 4 is called the base and 2 is called the exponent.

83 Six cubed = ...

84 Seven squared = ...

85 Four to the power 5 ....

86 .... to the power .... $= 6^4$

87 If $3^x = 81$, then the value of x is ....

88 If $y^3 = 64$, then the value of y is ....

89 $3 \times 3 \times 3 \times 3 \times 3 \times 3 = ...^{......}$

90 $5^{......} = 1$

91 $4^{......} = 4$

92 $8 \times 8 \times 8 = ...^3$

93 7^2 = ... × ......

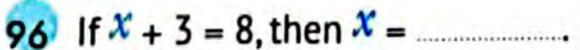
94 $6^2 \div 3^2 \times 2$ = ...

95 Using the opposite model:

The equation is ....

x = ...





96 If $x + 3 = 8$, then x = ...

97 If $y - 2 = 9$, then y = ...

98 If $8m = 16$, then $m =$ ....

99 If $\frac{1}{3}n = 3$, then $n =$ ....

100 If $a = 3$, then $a +$ ...... $= 7$

101 If $b = 5$, then $b -$ ...... $= 2$

102 If $d = 4$, then ...... $\times d = 20$

103 If $k = 12$, then $K \div$ ...... $= 4$

104 The inequality that represents all values less than -6 is ....

105 The similarities between the graphs of the two algebraic expressions $x = 6$ and $x \geqslant 6$ are ....

106 The inequality that represents all values greater than -1: ....

107 The inequality that represents all values less than 2: ....

108 The inequality that represents all values to the right of -9 on the number line are: ....

109 $e = (8 - r)$ independent variable is .... ,dependent variable is ....

110 In the equation $(m - 8) = a$, the dependent variable is ....

111 If the price of books depends on the number of books purchased, then:

The independent variable is ....

The dependent variable is ....

112 In the equation $m - 8 = a$, the independent variable is ....

113 The equation that represents the relationship between the number of months "x" and the total money she saved "y" is $y = 50x$, then.

-The independent variable is ....

-The dependent variable is ....

-The money she saved in 6 months is ....

114 If the equation is "$y = x + 4$", then the rule is ....

115 The mean of the values " 8 , 9 , 2 , 7 , 6 , 4 ,6" is ....

116 The median of the values " 8 , 2 , 10 , 1 , 3 , 7 , 2" is ....

117 The mode of the values " 9 , 2 , 8 , 3 , 7 , 3 " is ....

118 Range = ... − ....

119 It is easier to find the range using a .... or ....

120 The range cannot be found using ....

121 The range for the values "9, 2, 4, 1, 8, 5" is ....

122 If the largest value is 15 and the least value is 3, then the range = ...

123 If the range of a set of values is 12 and the smallest value is 5, then the largest value is ....

124 If the range of a set of values is 25 and the largest value is 52, then the smallest value is ....

125 .... and .... are affected by the presence of outliers.

126 If the mean of the values is 3, 4, 6, x, 7 is 6, then the value of x is ....

127 The outliers in the set of values 5, 18, 3, 4, 7, 6 are ....

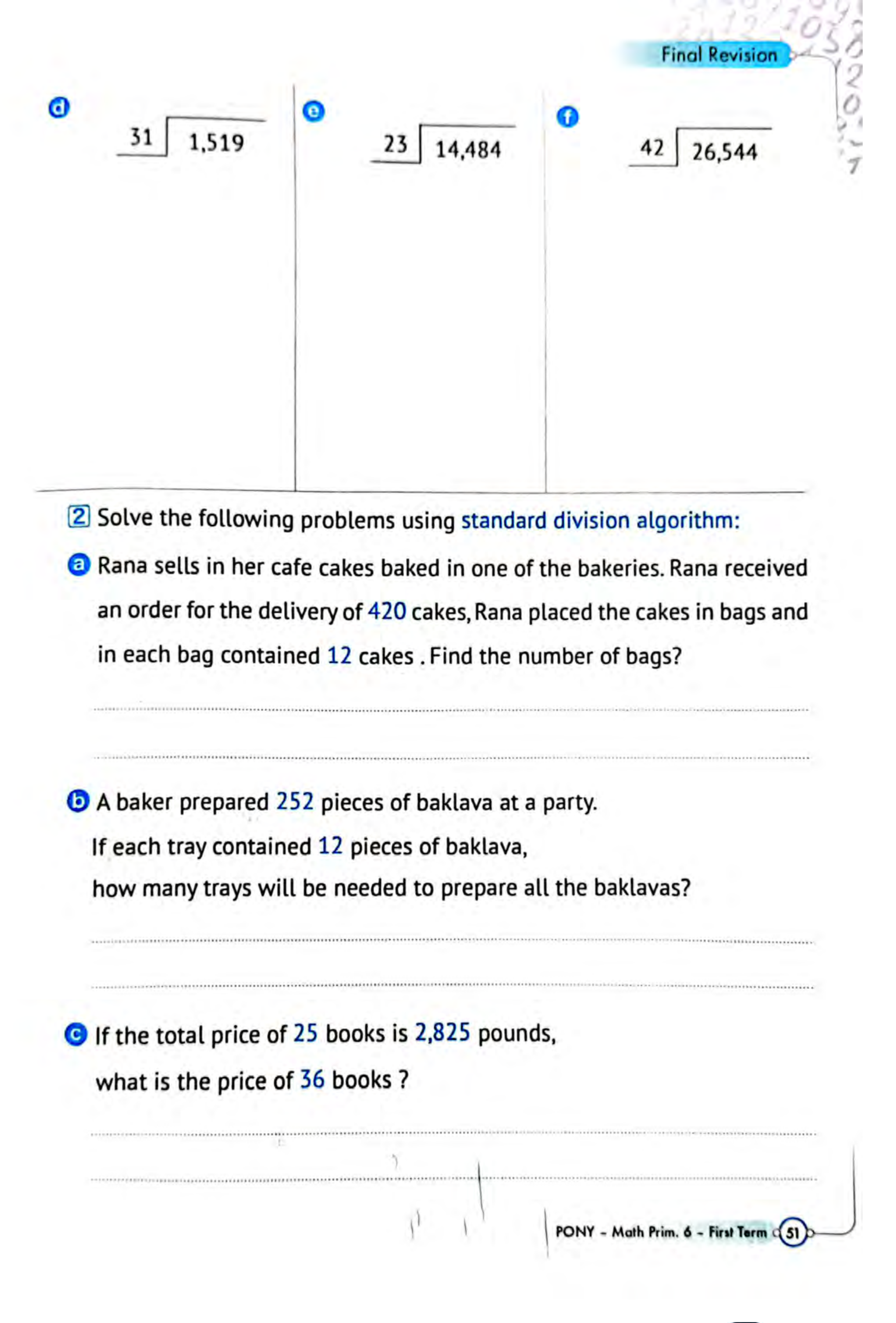
Third: Answer the following:

1 Find :

a) $285 \div 3 =$ ....

b) $1{,}728 \div 6 =$ ....

c) $2{,}657 \div 6 =$ ....



d) $31 \overline{)1,519}$

e) $23 \overline{)14,484}$

f) $42 \overline{)26,544}$

2 Solve the following problems using standard division algorithm:

a) Rana sells in her cafe cakes baked in one of the bakeries. Rana received an order for the delivery of 420 cakes, Rana placed the cakes in bags and in each bag contained 12 cakes . Find the number of bags?

....

....

b) A baker prepared 252 pieces of baklava at a party.
If each tray contained 12 pieces of baklava,
how many trays will be needed to prepare all the baklavas?

....

....

c) If the total price of 25 books is 2,825 pounds,
what is the price of 36 books ?

....

....

d The school library received 45 boxes, of 84 books each.

These books will be distributed among 12 cupboards.

How many books will be there in each cupboard?

....

....

....

e Hazem has 5 packs of red pencils, each with 32 pencils, and 4 boxes of blue pencils each pack has 16 pencils.

He wants to distribute them evenly to 8 of his friends.

How many pencils will each friend get?

....

....

f A school has 604 boys and 521 girls, it is intended to divide the boys and girls equally into 25 classes in the school. How many students will be in each class?

....

....

[3] Complete using the opposite Venn diagram:

....

2 2 | 3 | 3 5

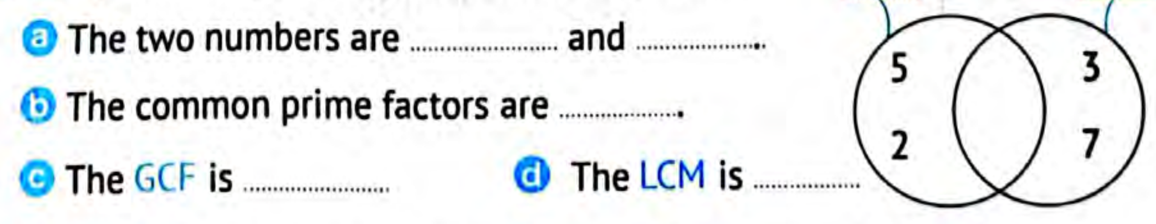
a The two numbers are .... and ....

b The common prime factors are ....

c The GCF is .... **d** The LCM is ....

e Are the two numbers relatively prime? .... (Yes or No)

[4] Complete using the opposite Venn diagram:



a The two numbers are .... and ....

b The common prime factors are ....

c The GCF is .... **d** The LCM is ....

e Are the two numbers relatively prime ? .... (Yes or No)

5 Ahmed wants to grow 20 jasmine plants and 30 phil plants in his garden. Ahmed wants to plant these plants in basins so that each basin contains the same number of the two types of plants.
Write a numerical expression that represents the largest number of ponds he can plant.

....

....

....

.... = ...

.... = ...

GCF = ...

6 A merchant has 16 kg of oranges and 24 kg of apples, so if the merchant wants to divide the oranges and apples in bags of the same mass, what is the largest number of bags that can be made for each type of fruit? Does each bag have the same mass? How many kilograms of oranges will each bag contain? How many kilograms of apples will each bag contain?

....

....

....

.... = ...

.... = ...

GCF = ...

7 Mahmoud wanted to divide 28 pens and 42 notebooks into groups, so that each group contained the same number of tools. What is the largest number of groups that can be configured for each type of instrument to have for each same number group? How many pens are in each group? What is the number of notebooks in each group?

....

....

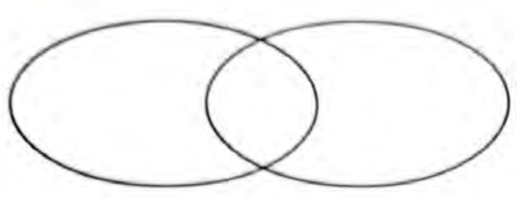
....

.... = ...

.... = ...

GCF = ...

8 Find the GCF and LCM using Venn diagram for numbers 24 and 16:



GCF = ...

LCM = ...

24 = ...

16 = ...

9 Find the result:

a) $4\frac{1}{4} + 2\frac{7}{12} =$ ....

b) $7\frac{1}{5} + 3\frac{1}{4} =$ ....

c) $4\frac{2}{5} - 3\frac{1}{4} =$ ....

d) $7\frac{1}{2} - 3\frac{3}{4} =$ ....

10 Ahmed has $5\frac{3}{4}$ LE and Tamer has $15\frac{1}{2}$ LE. Find out the total sum of what they have altogether.

....

....

11 Shaima bought a pen for $9\frac{1}{2}$ pounds, a ruler for $5\frac{1}{4}$ pounds, and a notebook for 4 pounds. How much did Shaima pay?

....

....

12 Wael collected $3\frac{3}{4}$ kilograms of dates and gave $2\frac{1}{5}$ kilograms to his friend. How many kilograms left with Wael?

....

....

13 A road is 15 km long. it's paved in three stages; $6\frac{2}{5}$ km in the first stage, $4\frac{1}{2}$ km in the second stage. How long is the distance paved in the third stage?

....

....

14 Compare using (< , = , or >):

a) 2 ⬜ 3 b) -67 ⬜ -5 c) -8 ⬜ 5

d) $|-1.5|$ ⬜ -1.5 e) $|3\frac{1}{4}|$ ⬜ $|4\frac{1}{3}|$ f) -3.8 ⬜ -1.8

g) 5.07 ⬜ $|-5.07|$ h) $|-2.5|$ ⬜ $|-3.6|$ i) -0.7 ⬜ $|-0.7|$

15 Arrange each group of the following numbers in ascending and descending order:

a) $8, -17, |-3|, -9, |12|$

Ascending order: .... , ... , ... , ... , ...

Descending order: .... , ... , ... , ... , ...

b) $-\frac{3}{4}, \frac{5}{8}, \frac{1}{2}, \frac{3}{4}, \frac{1}{4}$

Ascending order: .... , ... , ... , ... , ...

Descending order: .... , ... , ... , ... , ...

16 Follow the order of performing operations, then find the value of each of the following:

a) $48 \div 8 \times 2$ = ... = ...	b) $4 + 5 \times 6$ = ... = ...	c) $15 \div 3 + 7$ = ... = ...
d) $5 \times 2 + 3 \times 4$ = ... = ...	e) $(3 + 6) \times 2$ = ... = ...	f) $[3 \times (9 - 4)] - 10$ = ... = ...
g) $3^2 + 2 \times 5$ = ... = ...	h) $3 \times 2^3 \div 12$ = ... = ...	i) $(2^4 - 1) \div (3^2 - 4)$ = ... = ...

17 Find the value of the algebraic expression in each of the following:

a) $4a - 15 + 3$ [If $a = 2$] = ... = ... = ...	b) $(6b + 3) \div 7$ [If $b = 3$] = ... = ... = ...
c) $g^2 - 32 + 8$ [If $g = 5$] = ... = ... = ...	d) $3^b + 6 \times (b^2 - 3)$ [If $b = 2$] = ... = ... = ...

18 Write a mathematical expression that expresses each of the following situation:

a) Bassem runs one kilometer in 15 minutes.

The number of kilometers that Bassem runs in "t" minutes is ....

ⓑ In a car park, an amount of 10 pounds is collected for parking the car for first hour, and 5 pounds are added for each hour of waiting after the first hour.

The amount collected for parking the car for "h" hours after the first hour is ....

ⓒ Hala receives a daily wage of "p" pounds. If her expenses in 10 days amounted of 325 pounds.

The amount remaining with her in 10 days is ....

19 Find the value of the variable in each of the following equations:

ⓐ 4a – 15 ÷ 3 [If a = 6] = ... = ...	ⓑ y – 6 = 11 = ... = ...
ⓒ 3 b = 45 = ... = ...	ⓓ a ÷ 6 = 3 = ... = ...

20 Diaa saves 150 pounds every month from expenses, so if the amount that he saves in (x) month is (y) pounds, then:

ⓐ The equation that represents this situation is ....

ⓑ The independent variable is ....

ⓒ The dependent variable is ....

ⓓ What Diaa saves in a year is ....

21 If Hazem owns a discount card of 50 pounds. Complete:

ⓐ The equation represents the relationship between Hazem's purchases amounted (x) pounds, and the amount to be paid after the discount (y) pounds is ....

ⓑ The independent variable is ....

ⓒ The dependent variable is ....

ⓓ The required amount if the purchase price before the discount is 420 pounds is ....

22 Omar manufactures hats, producing 10 hats per day. Complete the following table representing the number of working days (x) and the number of hats produced (y).

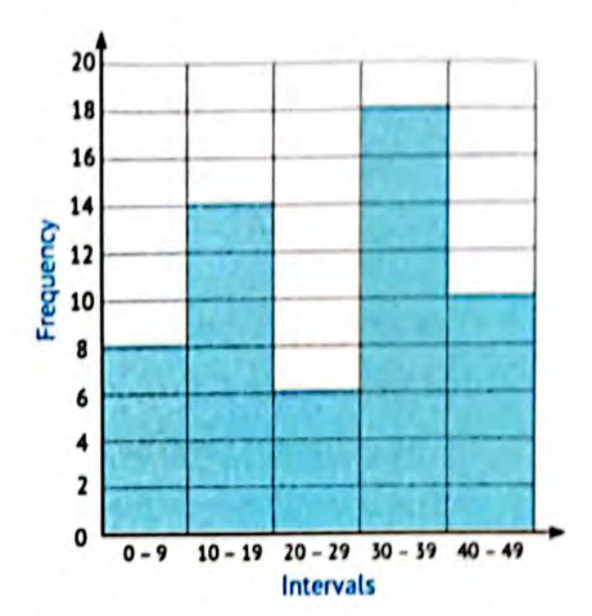
Write an equation that shows the relationship between the variables x and y and then represent it graphically.

x	2	4	7	9
Y	....	....	....	....

The equation: ....

23 Using the following histogram, complete the following interval table:

Intervals	Frequency
0 – 9	....
10 – 19	....
20 – 29	....
30 – 39	....
40 – 49	....



24 The box plot for each of the following groups of values:

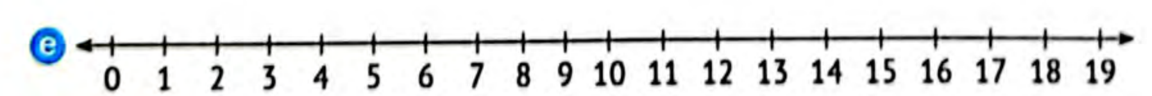
3 , 8 , 7 , 2 , 10 , 12 , 9 , 2 , 10 , 9

a Arrangement: ....

b Lower Quartile: ....

c Median: ....

d Upper Quartile: ....

e


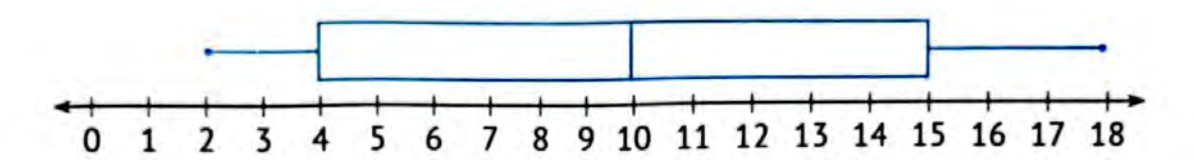
25 If the heights of 5 pupils in the first preparatory grade in centimeters are: 132 , 131 , 126 , 128 , 133 .

Calculate the mean for these heights.

....

....

26 Find 5- points summary using the following box plots:



a The Minimum Value: ....

b The Lower Quartile: ....

c The Median: ....

d The Upper Quartile: ....

e The Maximum Value: ....

27 The following table represents the temperatures recorded in a city in a week:

Day	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Temperature	24°	20°	30°	21°	23°	22°	21°

Using the values shown in the previous table to find:

a The Mean: ....

b The Median: ....

c The Mode: ....

d The Range: ....

e The Outliers: ....



28 Complete the following table using the dot plot graph for each of the following:

	Graph	Mean	Median	Mode	Outliers
a	0 1 2 3 4 5 6 7 8 9 10				
b	10 11 12 13 14 15 16 17 18 19 20				
c	5 6 7 8 9 10 11 12 13 14 15				
d	20 21 22 23 24 25 26 27 28 29 30				

29 Match each of the following with the appropriate graph(s):

a Representation of individual values •

b Representation of hundreds of notes •

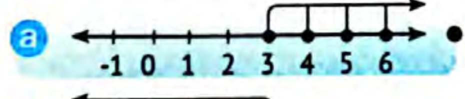
c Representation of data clusters and gaps in the data •

• Histogram 1

• Dot plot 2

• Box plot 3

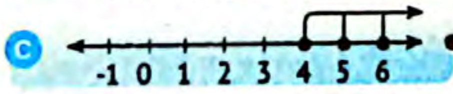
30 Match each number line to the inequality it represents:

a 

•

b 

•

c 

•

d -1 0 1 2 3 4 5 6 •

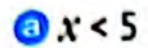
• $x < 3$ 1

• $x \geqslant 3$ 2

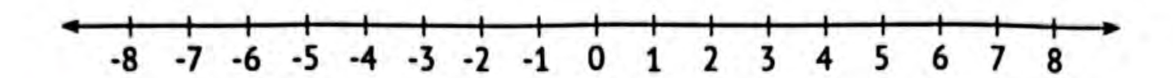
• $x > 3$ 3

• $x \leqslant 3$ 4

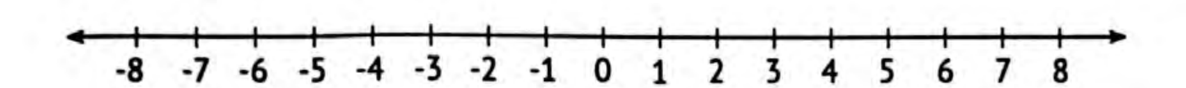
31 Use the number line to represent each of the following inequalities:



ⓐ $x < 5$



ⓑ $x \geq -2$



3 Model Exams

Model 1

First: **Choose the correct answer:**

a) The GCF of 4 and 15 is .... (0 or 1 or 4 or 5)

b) $1\frac{3}{4} + 2\frac{1}{2} =$ .... ($4\frac{1}{4}$ or $3\frac{1}{4}$ or $3\frac{4}{6}$ or 4)

c) In the algebraic term " $-3 \times y$ ", the coefficient is ....

(y or x or 3 or −3)

d) If we subtract 5 from x, the result is ....

(x + 5 or x − 5 or 5 − x or 5x)

e) $3^0 =$ .... (3 or 0 or 1 or 3 × 0)

f) A statistical question ....

(results in a lot of different answers or has an answer of yes or no or has one answer or results in one number)

g) In each of the bar graphs and histograms, ...

(bars are used to represent data or each bar represents an interval or each bar represents one number or the data is shown above the number line)

Second: **Complete the following:**

a) If 13 X 48 = 624, then 624 ÷ 13 = ...

b) All prime numbers are odd numbers, except .... is an even number.

c) The algebraic factor in "2.5x" is ....

d) Baher has "m" stickers in the sticker book, then he puts up 12 more stickers, so he has now ....

e) The value of the expression "r^2" if (r = 9) is ....

f. The inequality that represents all values greater than −1 is

g. The range for the values " 9, 2, 4, 1, 8, 5" is .

h. The types of statistical data are data and data.

Third: Choose the correct answer:

a. The integer that expresses the depth of a well of 5 meters is .

(−5 or 5 or −10 or 10)

b. −6 in the form $\frac{a}{b}$ is . ($-\frac{1}{6}$ or $-\frac{6}{1}$ or $\frac{1}{6}$ or $\frac{6}{1}$)

c. The value of the expression $a^2 + 2 \times 3$ if $a = 3$ is .

(15 or 33 or 12 or 24)

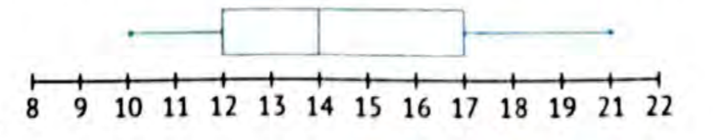
d. The inequality that represents all values less than or equal to −1 is .

($x > -1$ or $x < -1$ or $x \leqslant -1$ or $x \geqslant -1$)

e. In "$u = 3 + w$", the independent variable is .... (w or u or 3 or $\frac{w}{3}$)

f. The mean of the values: 45, 15, 40, 70, 80 is .... (40 or 45 or 50 or 60)

g. The lower quartile of the values represented using the opposite box plot is ....



(10 or 12 or 14 or 17)

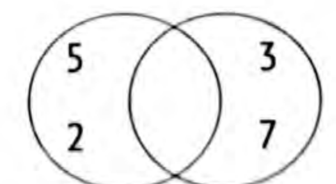
Fourth: Answer the following:

1 Find the result:

a. 1,976 ÷ 8 = ...

b. $9\frac{4}{5} - 3\frac{1}{2} =$ ....

2 Using the opposite Venn diagram, complete:



a. The two numbers are .... and ....

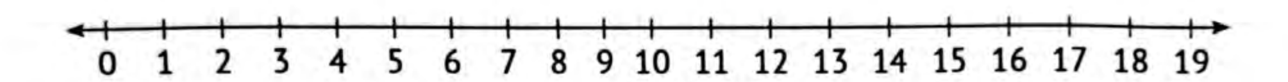
b. The common prime factors are: ....

ⓒ The GCF is .... ⓓ The LCM is ....

ⓔ Are the two numbers relatively prime? .... (Yes or No)

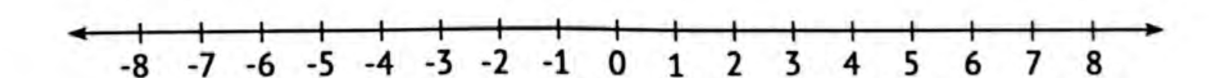
3 Draw the box plot for each of the following groups of values:

3, 8, 7, 2, 10, 12, 9, 2, 10, 9



4 Use the number line to represent the following inequality:

$x < 5$



Model 2

First: Choose the correct answer:

a. The LCM of any two prime numbers is ....

(1 or the smallest number or their sum or their product)

b. $6 \times (7 + 5) =$ ....

($(6 \times 7) + (6 \times 5)$ or $6 \times 7 + 5$ or $6 \times 7 \times 5$ or $(6 + 7) \times (6 + 5)$)

c. The algebraic term "$\frac{-1}{5}x$" has .... factor(s). (1 or 2 or 3 or 4)

d. Ahmed and Tamer have 60 pounds. If Ahmed has x pounds, then Tamer has .... pounds. ($60 + x$ or $60 - x$ or $60x$ or $60 + x$)

e. $4^2 =$ .... (4×2 or 4×4 or $4 + 2$ or $4 + 4$)

f. .... are categorical data.

(Dates of birth or Ages or Weights or Favorite colors)

g. In each of the bar graphs and histograms, ...

(bars are used to represent data or each bar represents an interval or each bar represents one number or the data is shown above the number line)

Second: Complete the following:

a. If $976 = 61 \times 16$, then $985 \div 61 = 16$, and the remainder is ....

b. .... is the only prime even number.

c. The coefficient in the algebraic term "$3xy$" is ....

d. Two numbers whose sum is 12, one of which is d, so the other number is ....

e. The value of the expression $3 \times (y^2 - 5)$ if $(y = 3)$ is ....

f. If $5 = |a|$, then $a =$ .... or ....

g. .... data is written in the form of numbers.

h. Range = ... - ....

Third: Choose the correct answer:

a) All positive numbers ...... zero (< or > or ≤ or =)

b) | −3.7 | = ... (3.7 or −3.7 or 37 or −37)

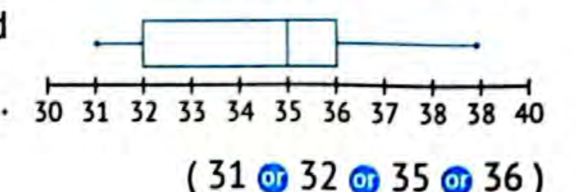
c) If a + 8 = 15, then a = ... (7 or 15 or 8 or 23)

d) The inequality that represents all values to the left of 5 on a number line is .... (x > 5 or x < 5 or x ≤ 5 or x ≥ 5)

e) In a = 5d, the dependent variable is .... (5 or a or d or 5d)

f) If the mean of the values: 12, 15, x, 8 is 10, then the value of "x" is ....
(40 or 5 or 20 or 10)

g) The median of the values represented using the opposite box plot is ....



(31 or 32 or 35 or 36)

Fourth: Answer the following:

1. A baker prepared 696 pieces of baklava at a party.
If each tray contains 12 pieces of baklava, how many trays will be needed to prepare all the baklava?

....

2. Bassem runs one kilometer in 20 minutes. Then, the number of kilometers that Bassem runs in "t" minutes is ....

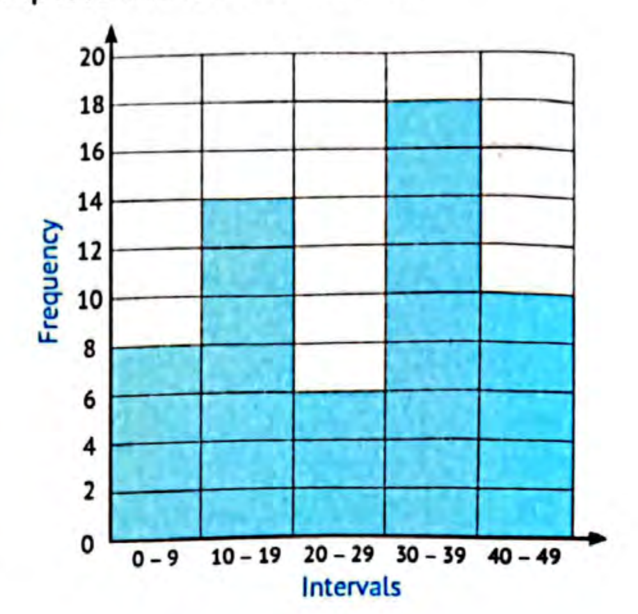
3. Hazem owns a discount card of 70 pounds. Complete:

a) The equation that represents the relationship between Hazem's purchases amounted (x) pounds, and the amount to be paid after the discount (y) pounds is ....

b) If the purchase price before the discount is 560 pounds, then the required amount is ....

4 Using the following histogram, complete the intervals table:

Intervals	Frequency
0 – 9	....
10 – 19	....
20 – 29	....
30 – 39	....
40 – 49	....





First: **Choose the correct answer:**

a) The LCM of any two prime numbers is ....

(the smallest number or 1 or their sum or their product)

b) $7 \times (2 + 9) =$ ....

($(7 \times 2) + (7 \times 9)$ or $7 \times 2 + 9$ or $7 \times 2 \times 9$ or $(7 + 2) \times (7 + 9)$)

c) In the algebraic expression "$3y + 9$", the absolute term is ....

(9 or 3 or y or 3y)

d) Basem is "x" years old now, how old will he be after 5 years? ....

($x - 5$ or $x + 5$ or $5 \div x$ or $5x$)

e) $5 \times 3 + 2^2 =$ .... (35 or 19 or 51 or 17)

f) .... are categorical data.

(The number of students in each class or Test scores or The number of family members or Favorite TV shows)

g) In ...., there is a graduated scale for the vertical axis.

(the dot plots only or the bar graph only or histogram only or both of bar graph and histogram)

Second: **Complete the following:**

a) If $2{,}000 \div 51 = 39$, and the remainder is 11, then $51 \times 39 =$ ....

b) All natural numbers are also .... numbers and .... numbers.

c) The number of terms in the algebraic expression $3xy - 25$ is ....

d) The verbal form for the algebraic expression "$5a + 7$" is ....

e) The algebraic expressions "$2x + 3$" and "$2(x + 1)$" are .... expressions. (equal or not equal)

f) In 5^7, 5 is called .... and 7 is called ....

g) "What color are your eyes?" is a .... question.

h) The mean of the values "8, 9, 2, 7, 6, 4" is ....

Third: Choose the correct answer:

a. All negative numbers ...... zero (< or = or > or ≤)

b. The opposite of $-\frac{3}{4}$ is .... ($\frac{3}{4}$ or $-\frac{4}{3}$ or $\frac{4}{3}$ or $1\frac{1}{3}$)

c. If Hanan saves "d" pounds daily for 5 days, then her father gives her 20 pounds, so the amount that Hanan has now is ....

(5 + 20d or 20 – 5d or 5d + 20 or 5 × (d + 20))

d. The graph of the inequalities $x < 4$ and $x \leq 4$ on a number line are similar in: ....

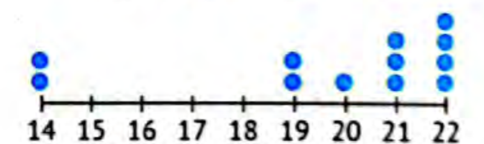
(4 belongs to both or each including all values to the left of 4 or there is a common number between them or each of them includes all the values to the right of 4)

e. In the expression "$y = \frac{1}{4}x - 2$", if $x = 32$, then $y =$ .... (0 or 2 or 6 or 30)

f. If the sum of 8 values equals 48, then the mean of these values is ....

(40 or 56 or 24 or 6)

g. The correct description that applies to the opposite graph is that the mean ....



(increases or decreases or remains the same)

Fourth: Answer the following:

1. Find the value of:

a. $3^b + 6 \times (b^2 - 3)$ [If b = 2]

= ......

= ......

= ......

b. $3 \times 2^3 \div 12$

= ......

= ......

= ......

2 Omar manufactures hats; he produces **5** hats per day. Write an equation that shows the relationship between the variables x and y and then represent it graphically.

x	2	4	7	9
Y	....	....	....	....

The equation: ....

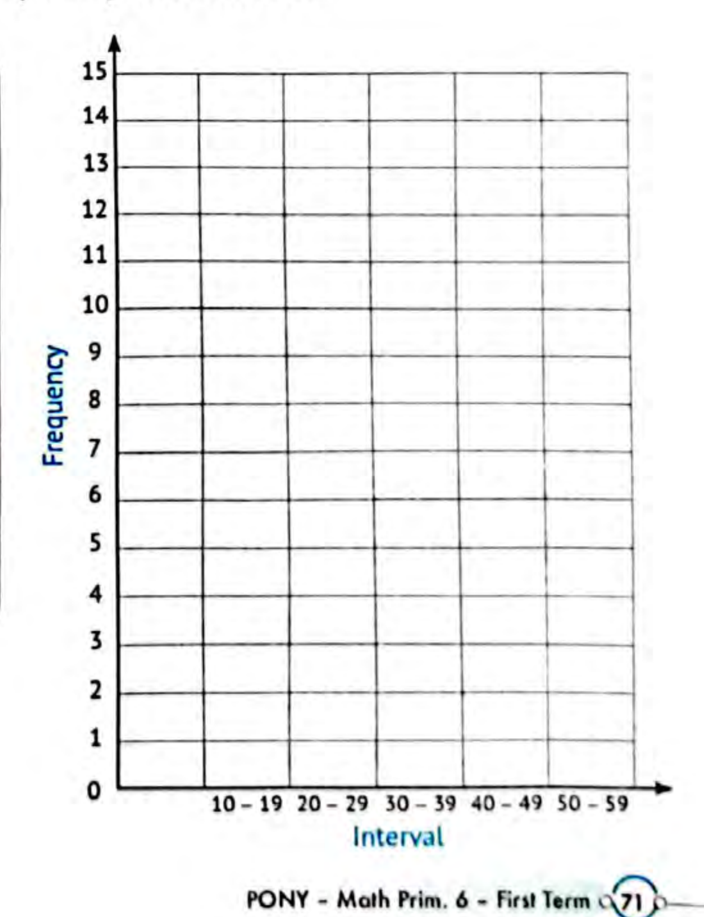
3 Arrange the following group of numbers in an **ascending** order:

$8 , -17 , |-3| , -9 , |12|$

Ascending order: .... , ... , ... , ... , ...

4 The following table shows the number of cars violating traffic lights that were detected by surveillance cameras at different time periods. Draw the histogram for this frequency distribution.

Interval in Minutes	Frequency of the Number of cars
10 – 19	6
20 – 29	7
30 – 39	15
40 – 49	8
50 – 59	12



Model 4

First: Choose the correct answer:

a) If the prime factors of a number are $2 \times 2 \times 2$, then the number is ....

(8 or 4 or 6 or 222)

b) The greatest common factor of any two prime numbers is ....

(the smallest number or 1 or their sum or their product)

c) If the height of the school building is m meters and the height of the tree adjacent to this building is 10 meters less than it, then the height of the tree is .... meters. (m + 10 or m – 10 or 10m or $\frac{m}{10}$)

d) 3^0 ...... 0^3 (< or = or > or ≤)

e) If the price of one shirt is 120 pounds, then the price of m number of shirts is .... (120m or 120 ÷ m or 120 + m or 120 – m)

f) The horizontal axis includes numerical periods in ....

(dot plots or bar graphs or double bar graphs or histograms)

g) .... may be used to display numerical data.

(Dot plots or Bar graphs or Histograms or All of the previous)

Second: Complete the following:

a) The number that, if divided by 35, the quotient will be 139, and the remainder is 21, is ....

b) ...... × (...... + ...) = (7 × 2) + (7 × 4)

c) If Salah saves z pounds per day, then he saves .... pounds in a week.

d) Like terms for the algebraic expression "3n + 3 + 2n" are ....

e) If $7x = 35$, then the value of x is ....

f) In the equation $y = x + 4$, the dependent variable is ....

g) .... data is written in the form of words.

h) The types of pens preferred by the students of your class is a .... data.

Third: Choose the correct answer:

a. The largest non-positive integer is .... (–1 or 1 or –100 or 0)

b. "0" is a/an .... number.

(counting or natural or negative integer or odd)

c. The inequality representing negative numbers are ....

($x > 0$ or $x < 0$ or $x \leqslant 0$ or $x \geqslant 0$)

d. The relationship that represents the equation $y = \frac{1}{3}x$ is ....

(divide by 3 or multiply by 3 or divide by $\frac{1}{3}$ or subtract $\frac{1}{3}$)

e. In $y = 6x + 4$, if $x = 3$, then $y =$ .... (10 or 22 or 18 or 67)

f. If the sum of a set of values is 36, and the mean of these values is 6, then the number of these values is .... (6 or 42 or 30 or 216)

g. The .... will be the best choice as a measure of the central tendency in the opposite graph.

1 2 3 4 5 6 7 8 9

(mean or mode or median or range)

Fourth: Answer the following:

1. Mahmoud wanted to divide 28 pens and 42 notebooks into groups so that each group contained the same number of supplies. What is the largest number of groups that can be configured for each type of supply to have the same number in each group? How many pens are in each group? What is the number of notebooks in each group?

....

....

....

.... = ...

.... = ...

GCF = ...

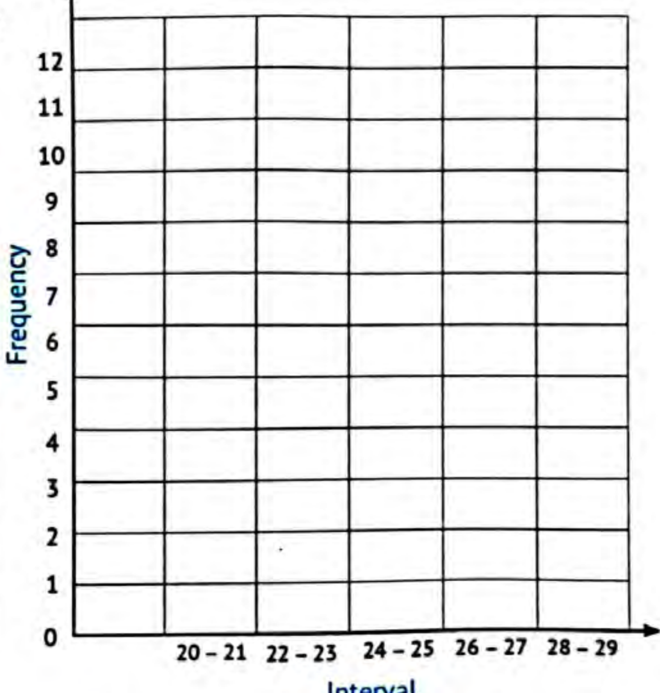
2 15 pounds will be added for the delivery of fast food meals in a restaurant. Complete:

a) The equation that represents the relationship between the price of meals (x) and the amount to be paid including delivery (y) is ....
....

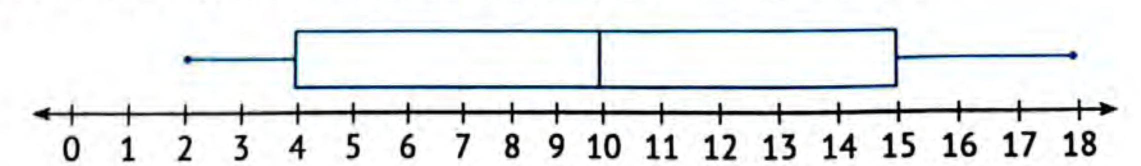
b) If the price of the meals is 120 pounds, the required amount is ....

3 The following table shows the recorded temperatures in 40 cities in one day. Draw the histogram of the following frequency table.

Interval Temperatures	Frequency of Number of Cities
20 – 21	8
22 – 23	12
24 – 25	9
26 – 27	7
28 – 29	4



4 Find the 5-points summary using the following box plots:



a) Minimum value: ....

b) Lower quartile: ....

c) Median: ....

d) Upper quartile: ....

e) Maximum value: ....



First: **Choose the correct answer:**

a) The prime factors of 12 are .... (2×6 or 1×12 or 3×4 or $2 \times 2 \times 3$)

b) $2\frac{3}{4}$ + ... = $5\frac{1}{2}$ ($2\frac{3}{4}$ or $2\frac{1}{2}$ or $3\frac{3}{4}$ or $3\frac{1}{2}$)

c) In the algebraic expression "5b + 6", the absolute term is ....

(5 or 5b or 6 or b)

d) The algebraic expression representing: half the difference between the number a and 7 is ....

($\frac{1}{2}$ a – 7 or $\frac{1}{2}$ a + 7 or $\frac{1}{2}$ (a – 7) or $\frac{1}{2}$ (a + 7))

e) 3^2 ▭ 2^3 (< or = or > or ≤)

f) A .... does not have a vertical axis.

(dot plot or bar graph or double bar graph or histogram)

g) The best graph to represent the number of pupils whose heights range from 150 – 160 cm is a ....

(dot plot or bar graph or histogram or box plot)

Second: **Complete the following:**

a) 5 × (3 + 6) = (........ × ....) + (........ × ....)

b) The GCF of the two relatively prime numbers is ....

c) Like terms in the algebraic expression 6x + 6y + 2x + 6 are ....

d) If the side length of a square is s cm, then the perimeter of the square is ....

e) $8 \times 8 \times 8 = \dots\dots^{3}$

f) If 8m = 16, then m = ...

g) "Do you like the red color?" is a .... question.

h) The range cannot be found using ....

Third: Choose the correct answer:

a) The largest negative integer is .... (−1 or 1 or −100 or 0)

b) "1" is not a/an ....

(counting number or natural number or integer or even number)

c) The graph of the inequalities $x > 3$ and $x < 3$ on a number line are similar in: .... (3 doesn't belong to any of them or both include all values to the left of 3 or there is a common number between them or each of them includes all the values to the right of 3)

d) Which of the following values is a solution to the inequality $x \geqslant 5$?

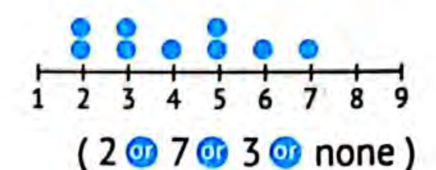
(−5 or 4.59 or −25 or 6)

e) The equation that expresses "multiply by 2 and then add 5" is ....

($y = 5x + 2$ or $y = 2(x + 5)$ or $y = 5(x + 2)$ or $y = 2x + 5$)

f) The median of the values: 4, 9, 7, 1, 1, 2 is .... (4 or 2 or 3 or 24)

g) The outliers of the values represented using the opposite dot plot is ....



(2 or 7 or 3 or none)

Fourth: Answer the following:

1 Find the result:

a) $1,440 \div 32 =$ ....

b) $4\frac{5}{6} - 2\frac{1}{2} =$ ....

2 If the heights of five pupils in the first preparatory grade in centimeters are 132, 131, 126, 128, 133, calculate the mean for these heights.

....

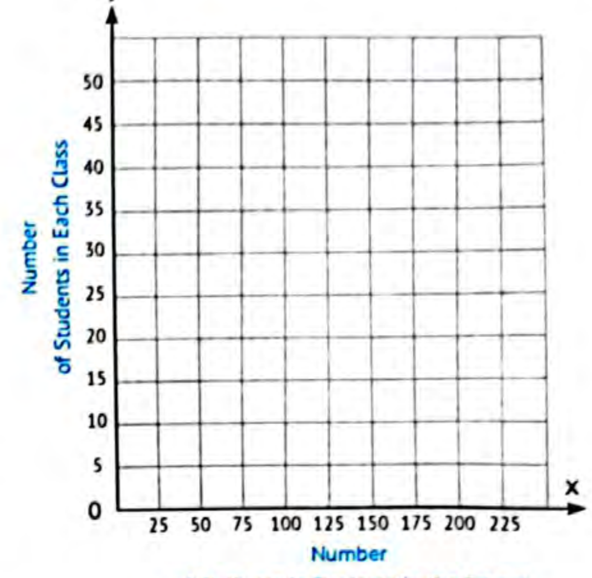
....

3 The school has 5 classes for the sixth grade. Complete the following table, where the variable x represents the sixth-grade students in the school. Write an equation that shows the relationship between the variables x (number of sixth-grade students) and y (number of students in each class), and then represent it graphically.

x	150	175	....	....
Y	....	....	40	45

The equation

....



4 Match each of the following situations with the appropriate graph(s):

a Representation of individual values •	• Histogram 1
b Representation of hundreds of notes •	• Dot Plot 2
c Representation of data clusters and gaps in the data •	• Box Plot 3

Model 6

First: Choose the correct answer:

a) The prime number .... (has no factors or has only one factor or has only two factors or has only three factors)

b) The prime factors of 20 are ....(2×10 or 5×4 or $2 \times 2 \times 5$ or 1×20)

c) Like terms for the algebraic expression "$5 + 5y + 2y$" are ....
(5 , 5 y or 5y , 2y or 5 , 2y or 5 , 5y , 2y)

d) The algebraic expression representing: subtract 3 from twice the number x is .... ($x - 3$ or $2x - 3$ or $3x + 2$ or $5x$)

e) $4^{\text{.......}} = 1$ (0 or 1 or 2 or 5)

f) The best graph to represent the number of students absent on Sunday is .... (dot plots or bar graph or histogram or box plots)

g) The values "5, 3, 2, 5, 2, 7" have ....
(no mode or one mode or two modes or three modes)

Second: Complete the following:

a) $8 \times ($ .... + ... $) = ($ .... $\times 9) + ($ .... $\times 2)$

b) If $11 \times 27 = 297$, then $297 \div 27 =$ ....

c) Integers between -3 and 2 are ....

d) The absolute term in the algebraic expression $5b + 3.2$ is ....

e) Six cubed = ...

f) If $a = 3$, then $a +$ .... $= 7$.

g) If the price of books depends on the number of books purchased, then the independent variable is ....

h) The median of the values "8, 2, 10, 1, 3, 7, 2" is ....

Third: Choose the correct answer:

ⓐ The opposite of 5 is .... (– 4 or 4 or – 6 or 6)

ⓑ "– 2.5" is a/an ....

(counting number or natural number or integer or rational number)

ⓒ If y = 6, then $\frac{y}{.......}$ = 2. (3 or 8 or 12 or 4)

ⓓ Which of the following values is a solution to the inequality x < 9?

(10 or 9.1 or –9.5 or 9)

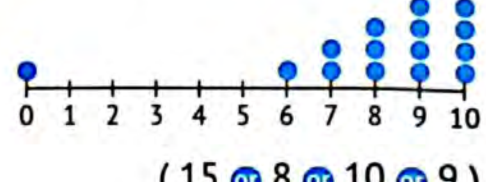
ⓔ The equation that expresses "subtract from 9" is ....

(y = x – 9 or y = 9 – x or y – x = 9 or y = 9x)

ⓕ .... use separate columns to represent the data.

(Dot plots or Bar graphs or Double bar graphs or Histograms)

ⓖ The median of the values represented using the opposite dot plot is ....



(15 or 8 or 10 or 9)

Fourth: Answer the following:

1 Using the opposite Venn diagram, complete:

2 2 | 3 | 3 5

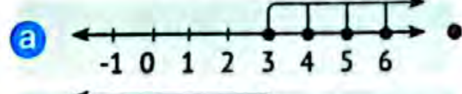
ⓐ The two numbers are .... and ....

ⓑ The common prime factors are ....

ⓒ The GCF is .... ⓓ The LCM is ....

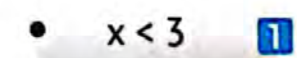
ⓔ Are the two numbers (relatively prime)? .... (Yes or No)

2 Match each number line to the inequality it represents:

ⓐ 

• x < 3 1

ⓑ -1 0 1 2 3 4 5 6 • x ⩾ 3 2

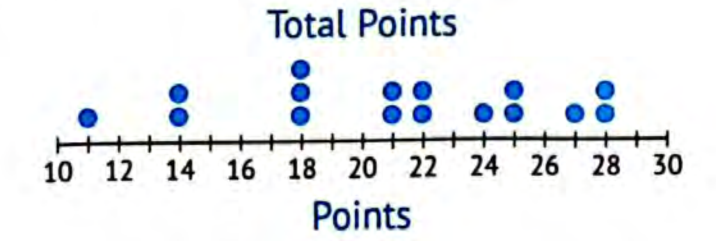
ⓒ -1 0 1 2 3 4 5 6 •  x > 3 3

ⓓ -1 0 1 2 3 4 5 6 • x ⩽ 3 4

3 Ahmed has $5\frac{3}{4}$ and Tamer has $15\frac{1}{2}$ LE. Find out the total sum of what they have altogether.

....

4 The following dot plot shows the total points Jalal scored in each basketball game this season. Complete:



a Range: ....

b Mean: ....

c Median: ....

d Mode: ....



First: **Choose the correct answer:**

a .... is a factor of all numbers. (0 or 1 or 2 or 3)

b 0, 6, 8, 2 are .... numbers. (even or odd or prime or counting)

c The number of terms of "$5x + 3y + 2$" is .... (2 or 3 or 5 or 6)

d Like terms for the algebraic expression "$2 + 3b + 2a$" are ....

(2 , 3b or 2 , 2a or 3b + 2a or none)

e Ziyad saved up x pounds and his father gave him 10 pounds so that he would have .... (x – 10 or x + 10 or 10 x or 10 – x)

f .... have a horizontal axis.

(Bar graphs or Double bar graphs or Histograms or All of the previous)

g If the mean of Manal and Siham's ages is 7 years, and Manal's age is 6 years, then Siham's age is .... years. (6 or 7 or 8 or 15)

Second: **Complete the following:**

a $| - 0.7 |$ = ...

b The LCM of the two relatively prime number is ....

c The smallest positive integer is ....

d The algebraic expression that expresses "three times b" is ....

e If $y - 2 = 9$, then y = ...

f The inequality that represents all values less than 2 is ....

g The number of letters of the first name of each student in the class is a .... data.

h .... and .... are affected by outliers.

Third: Choose the correct answer:

ⓐ .... is neither a positive nor a negative number. (0 or 1 or −1 or 10)

ⓑ 6 < .... (−8 or 8 or −9 or −7)

ⓒ 2 × 2 × 2 × 2 × 2 = ... (2^5 or 5^2 or 2 × 5 or 2 + 5)

ⓓ If 5x = 40 , then x = ... (35 or 45 or 8 or 200)

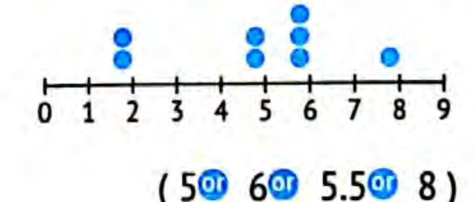
ⓔ If the dependent variable is the student's score in the exam, then the independent variable is ....

(the type of pen used in the solution or the age of the student or the number of correct answers or the number of questions in the exam)

ⓕ The range cannot be found using a ....

(dot plot or box plot or histogram or bar chart)

ⓖ The mode of the values represented using the opposite dot plot is ....



(5 or 6 or 5.5 or 8)

Fourth: Answer the following:

1. A road that is 15 km long was paved in three stages; $6\frac{2}{5}$ km was paved in the first stage, and $4\frac{1}{2}$ km was paved in the second stage. How long is the distance paved in the third stage? ....

2. Find the value of the algebraic expression in each of the following:

ⓐ $g^2 - 16 \div 8$ [If g = 2]

= ....

= ....

= ....

ⓑ $3^b + 6 \times (b^2 - 3)$ [If b = 3]

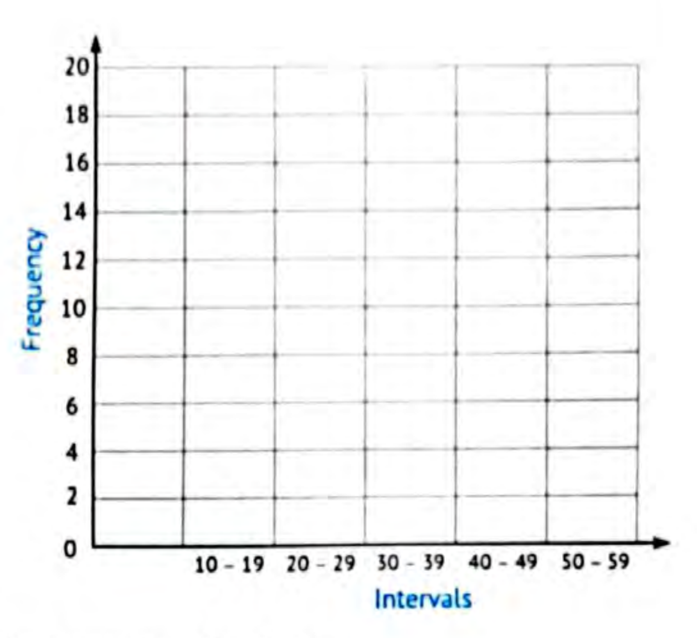
= ....

= ....

= ....

3 Draw the histogram of the following distribution, which represents the scores of 50 students.

Intervals	Frequency
10 – 19	8
20 – 29	14
30 – 39	6
40 – 49	18
50 – 59	4



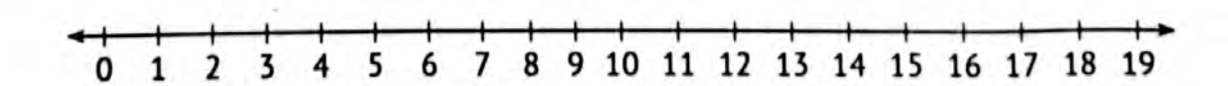
4 Draw a box plot for the following groups of values:

5 , 8 , 2 , 7 , 9 , 9 , 2

a Lower Quartile: ....

b Median: ....

c Upper Quartile: ....





Model 8

First: **Choose the correct answer:**

a) .... ÷ 9 = 15 R 3 (135 or 138 or 132 or 27)

b) .... is a prime number. (55 or 11 or 22 or 33)

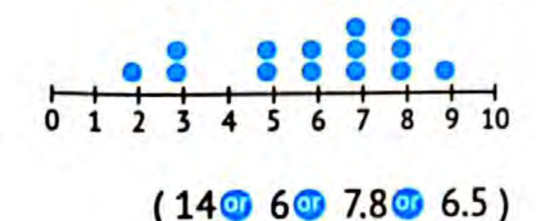
c) The coefficient in the algebraic term "$\frac{3}{8}$ a" is .... (a or 8 or 3 or $\frac{3}{8}$)

d) The algebraic term "5ab" is formed from .... factors. (1 or 2 or 3 or 4)

e) 1^5 = ... (1×5 or $1 + 5$ or 1 or 0)

f) If the range of a set of values is 11 and the smallest value is 7, then the largest value is .... (4 or 18 or 77 or 70)

g) The mean of the values represented using the opposite dot plot is ....



(14 or 6 or 7.8 or 6.5)

Second: **Complete the following:**

a) .... × (4 + 6) = (9 × ....) + (9 × ....)

b) −5 , −4 , −3 , −2 , ... , ... , ... , ...

c) The algebraic expression that expresses "adding z to 36" is ....

d) The value of the algebraic expression "$4 \times (y^3 - 7)$", if $y = 3$ is ....

e) If $k = 15$, then k + ... = 5.

f) In the equation a = 3b, the dependent variable is ....

g) If the mean of the values 3, 4, 9, x , 8 is 6, then the value of x is ....

h) The outliers in the set of values 5, 18, 3, 4, 7, 6 are ....

Third: Choose the correct answer:

ⓐ The opposite of -12 is .... (-12 or 12 or 1 or 2)

ⓑ 25 ...... -12 ($<$ or $=$ or $>$ or $\leq$)

ⓒ If $b = 6$, then $b +$ ...... $= 14$. (10 or 4 or 8 or 6)

ⓓ The inequality that represents all values less than or equal to -7 is ....

($x > -7$ or $x < -7$ or $x \leq -7$ or $x \geq -7$)

ⓔ If the amount of fuel consumed by the car depends on the distance traveled, then the independent variable is the ....

(fuel amount or distance traveled or traveled time or temperature)

ⓕ In the dot plots, ... (bars are used to represent data or there is no need for a horizontal axis or each information is represented by a point or data is displayed grouped in intervals)

ⓖ All the following are measures of the central tendency, except ....

(mean or median or mode or range)

Fourth: Answer the following:

1 A school with 795 boys and 521 girls wants to divide the boys and girls equally into 28 classes in the school. How many students will be in each class?

....

....

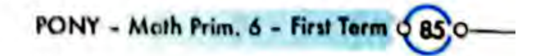
2 Using the mathematical expression "$5x + 2y + 6x + 3$", complete:

ⓐ The number of terms of the mathematical expression is ....

ⓑ Like terms are ....

ⓒ Coefficients are ....

ⓓ The absolute term is ....

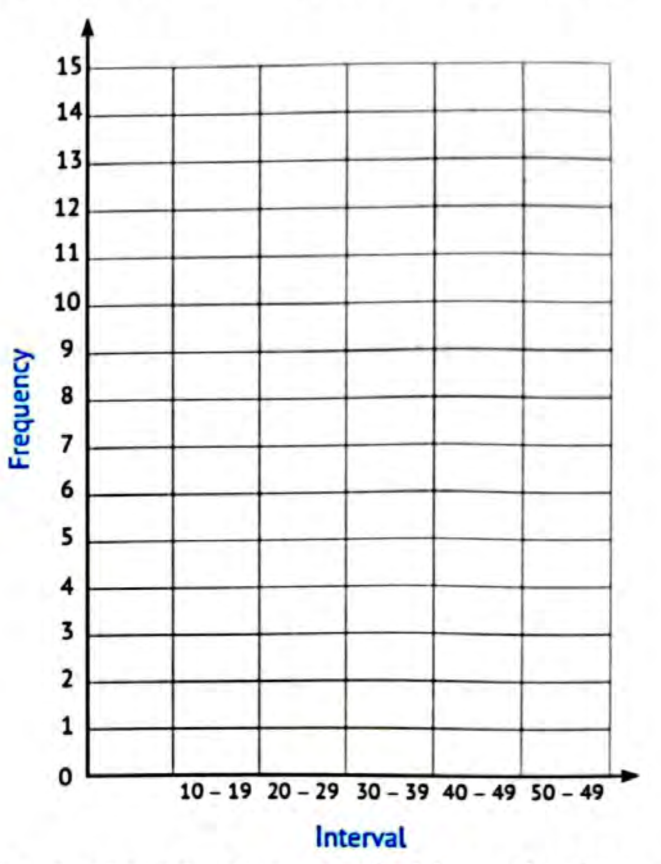




3 The following table shows the number of cars violating traffic lights that were detected by surveillance cameras at different time periods.

Draw the histogram for this frequency distribution.

Intervals	Frequency of the Number of Cars
10 – 19	6
20 – 29	7
30 – 39	15
40 – 49	8
50 – 59	12



4 The following table represents the temperatures recorded in a city in a week:

Day	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Temperature	22°	25°	30°	25°	23°	22°	21°

Using the values shown in the table, find:

a) Mean: ....

b) Median: ....

c) Mode: ....

d) Range: ....



Model 9

First: Choose the correct answer:

ⓐ If 574 = 41 × 14, and 580 ÷ 41 = 14, then the remainder is ....
(− 14 or 41 or 6 or 16)

ⓑ .... is a multiple of all numbers. (0 or 1 or 2 or 3)

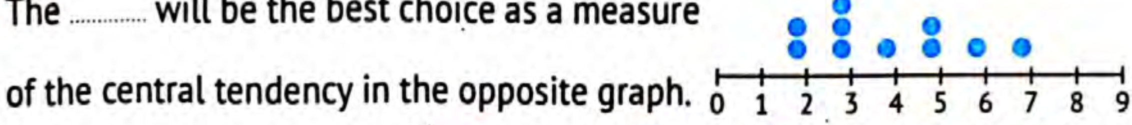
ⓒ In the algebraic term " $-3 \times y$ ", the coefficient is .... (y or x or 3 or − 3)

ⓓ If we subtract 5 from x , the result is ....
(x + 5 or x − 5 or 5 − x or 5x)

ⓔ 3^0 = ... (3 or 0 or 1 or 3 × 0)

ⓕ In bar graph: .... (each bar represents a number or one categorical data or it does not need a vertical axis or the bars must touch or each piece of information is represented by a dot)

ⓖ The .... will be the best choice as a measure of the central tendency in the opposite graph.



(mean or median or mode or mean and median)

Second: Complete the following:

ⓐ The additive inverse of 8 is ....

ⓑ The rational number $-\frac{9}{4}$ in decimal form is ....

ⓒ Two integers whose sum is 5 , one of which is 10, then the other number is ....

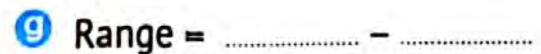
ⓓ Four to the power 5 = ...

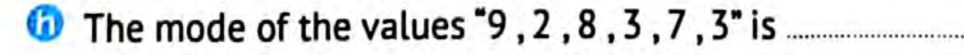
ⓔ If the price of books depends on the number of books purchased, then the dependent variable is ....

ⓕ Using the opposite model, the equation is ....




x = ...

ⓖ 
Range = ... − ....

ⓗ 
The mode of the values "9 , 2 , 8 , 3 , 7 , 3" is ....

Third: Choose the correct answer:

ⓐ $-9 >$ .... $(-15$ or 8 or -8 or $10)$

ⓑ The number just after -9 is .... $(-10$ or -8 or 10 or $8)$

ⓒ If $a + 8 = 15$, then $a =$ .... $(7$ or 15 or 8 or $23)$

ⓓ The inequality that represents all values to the left of 5 on a number line is .... $(x > 5$ or $x < 5$ or $x \leqslant 5$ or $x \geqslant 5)$

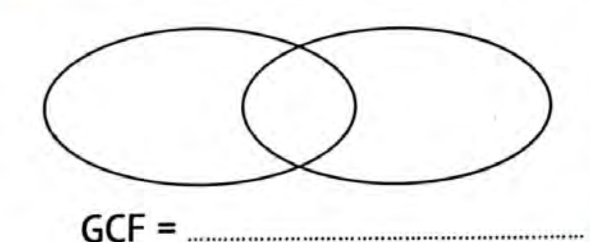
ⓔ In $a = 5d$, the dependent variable is .... $(5$ or a or d or $5d)$

ⓕ .... are categorical data.
(The numbers of students in each class or Test scores or The number of family members or Favorite TV shows)

ⓖ The mean of the values: 36, 24, 28, 40, 22 is ....
$(40$ or 45 or 50 or $30)$

Fourth: Answer the following:

1. Find the GCF and LCM using the Venn diagram for 24 and 16:



GCF = ...

LCM = ...

24 = ...

16 = ...

2. Diaa saves 150 pounds every month. If the amount he saves in (x) months is (y) pounds, then:

ⓐ The equation that represents this situation is ....

ⓑ The independent variable is ....

ⓒ The dependent variable is ....

(d) Diaa saves .... in a year.

[3] Draw a box plot for the following groups of values:

5 , 2 , 9 , 4 , 3 , 6 , 2

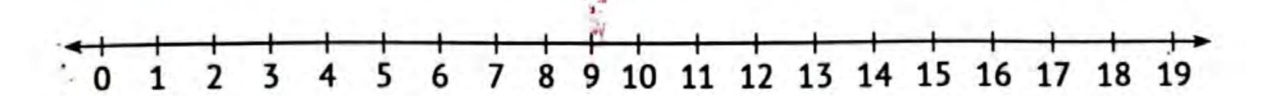
(a) Minimum value: ....

(b) Upper quartile: ....

(c) Lower quartile: ....

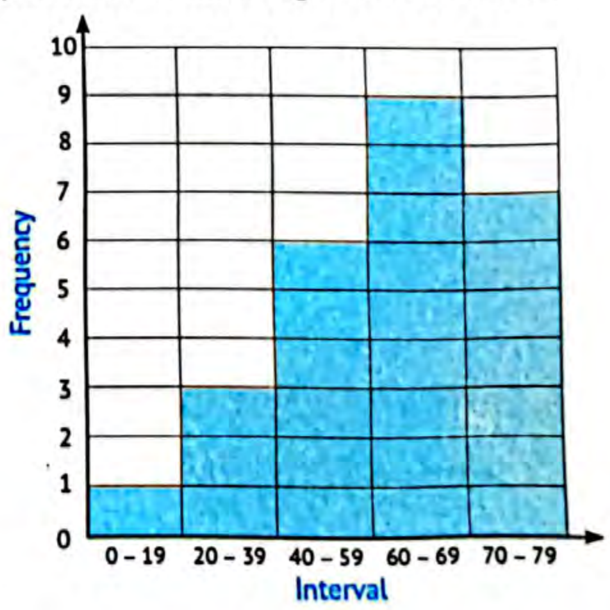
(d) Maximum value: ....

(e) Median: ....



[4] Using the following histogram, complete the following interval table:

Interval	Frequency
0 – 19	....
20 – 39	....
40 – 59	....
60 – 69	....
70 – 79	....



Model 10

First: Choose the correct answer:

ⓐ If $12 \times 34 = 408$, then $408 \div 12 =$ .... (12 or 34 or 408 or 36)

ⓑ 6 and .... are relatively prime numbers. (4 or 15 or 35 or 20)

ⓒ The algebraic term "$\frac{1}{5}x$" has .... factor(s). (1 or 2 or 3 or 4)

ⓓ Ahmed and Tamer have 60 pounds, if Ahmed has x pounds, then Tamer has .... pounds. ($60 + x$ or $60 - x$ or $60x$ or $60 \div x$)

ⓔ $4^2 =$ .... (4×2 or 4×4 or $4 + 2$ or $4 + 4$)

ⓕ In the histogram, ...

(it does not need a vertical axis or the columns must touch or data is shown above the number line or all bars are evenly spaced)

ⓖ The median of the values: 7, 2, 4, 3, 6, 8 is .... (4 or 6 or 5 or 10)

Second: Complete the following:

ⓐ $8 \times (9 + 2) = ($ ...... $\times 9) + ($ ...... $\times 2)$

ⓑ The number and its opposite are on .... from zero, but on two .... sides on the number line.

ⓒ The algebraic expression that expresses "5 less than x" is ....

ⓓ $7^3 =$ ...... $\times$ ...... $\times$ ......

ⓔ The inequality that represents the opposite model is ....



ⓕ $4^2 \div 2^2 \times 3 =$ ....

ⓖ The mean of the values "5 , 6 , 4 , 5 , 8 , 2 , 5" is ....

ⓗ If the range of a set of values is 20 and the smallest value is 8, then the largest value is ....

Third: Choose the correct answer:

a "– 3" is located to the right of .... on the number line.

(–4 or 4 or –2 or 2)

b An integer between 2 and -2 is .... (–1 or –3 or 3 or –4)

c The value of the expression $a^2 + 2 \times 3$, if $a = 5$ is ....

(15 or 31 or 12 or 24)

d The inequality that represents all values less than -2 is ....

($x > -2$ or $x < -2$ or $x \leqslant -2$ or $x \geqslant -2$)

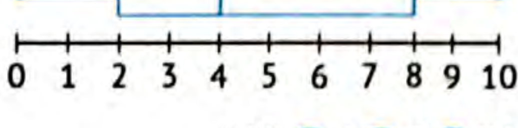
e In "$u = 3 \div w$", the independent variable is .... (w or u or 3 or $\frac{w}{3}$)

f The rational number represented on the opposite number line is ....

-8 -7 -6 -5 -4 -3

($4\frac{2}{3}$ or $5\frac{2}{3}$ or $-4\frac{2}{3}$ or $-5\frac{2}{3}$)

g The range of the values represented using the opposite box plot is ....



(10 or 2 or 4 or 8)

Fourth: Answer the following:

1. A merchant has 16 kg of oranges and 24 kg of apples. If the merchant wants to divide the oranges and apples in bags of the same mass, what is the largest number of bags that can be made for each type of fruit to have the same mass? How many kilograms of oranges will each bag contain? And how many kilograms of apples will each bag contain?

....

....

....

.... = ...

.... = ...

GCF = ...

[2] The price of one pen is 9 pounds. Complete :

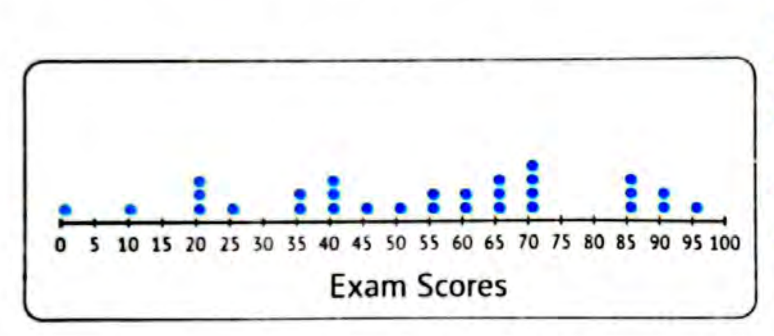
(a) The equation that represents the relationship between the number of pens (X) and the purchase price (y) is ....

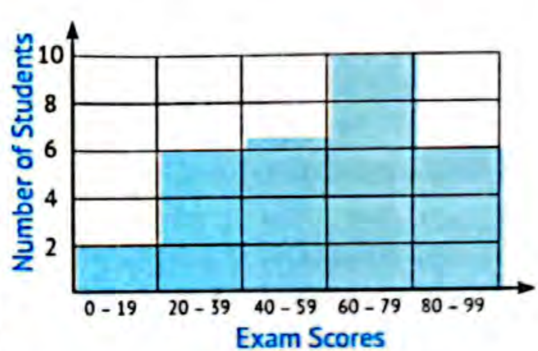
(b) The independent variable is ....

(c) The dependent variable is ....

The price of 6 pens is ....

[3] The dot plot and histogram below show the exam scores for a number of students in your class?





Answer the following, explaining the best graph that helps you in the answer:

(a) What is the highest grade obtained by the students?

(The answer: ....) (Best Graph: ....)

(b) What is the lowest score obtained by the students?

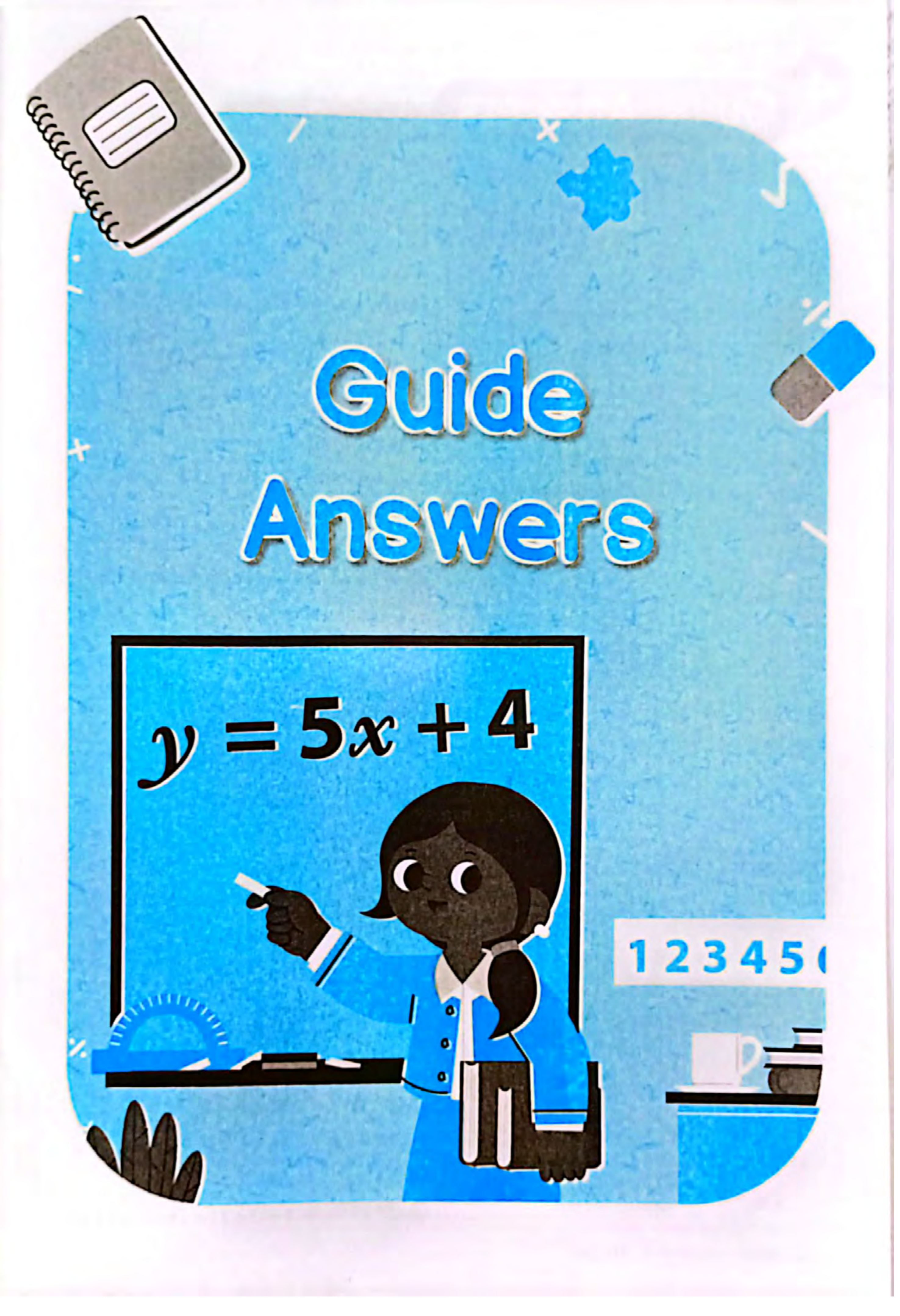
(The answer: ....) (Best Graph: ....)

(c) How many students did you score on the drawing?

(The answer: ....) (Best Graph: ....)

[4] Using the equation "$y = 2x + 3$", complete the following table:

x	2	5	9	3	4
Y	....	....	....	....	....


Guide
Answers
$y = 5x + 4$
1 2 3 4 5

4 Guide Answers Main Book

Unit 1

Lesson 1

Using Long Division in the Real world

1 a 157 b 649 c 1,188 r 1 d 1,203 r 4

2 a 23 b 1,048 r 16

3 a Number of hours = 9,672 ÷ 78 = 124 hours

b Number of total meals = 14 × 3 = 42 meals

c Number of total donation = 1,250 × 10

= L.E.12,500

d Number of cans = 6,975 ÷ 93 = 75 cans

Quiz

1 a 79 b 1235 c 412

2 a 15 × 105 = 1,575 rooms

b The share of each person = 24674 ÷ 26

= 949 pounds

Lesson 2

Prime Factorization

1 a 16 = 2 × 2 × 2 × 2

b 20 = 2 × 2 × 5 c 36 = 2 × 2 × 3 × 3

d 48 = 2 × 2 × 2 × 2 × 3

2 a 16 = 2 × 2 × 2 × 2

• 20 = 2 × 2 × 5 • GCF = 2 × 2 = 4

• LCM = 2 × 2 × 2 × 2 × 5 = 80

b 24 = 2 × 2 × 2 × 3

• 36 = 2 × 2 × 3 × 3 • GCF = 2 × 2 × 3 = 12

• LCM = 2 × 2 × 2 × 3 × 3 = 72

c 16 = 2 × 2 × 2 × 2 • 15 = 3 × 5

• GCF = 1

• LCM = 2 × 2 × 2 × 2 × 3 × 5 = 240

3 a 12 = 2 × 2 × 3 • 15 = 3 × 5

• GCF = 3 • LCM = 60 (No)

b 9 = 3 × 3 • 8 = 2 × 2 × 2

• GCF = 1 • LCM = 72 (Yes)

c 15 = 3 × 5 • 4 = 2 × 2

• GCF = 1 • LCM = 60 (Yes)

d 6 = 2 × 3 • 8 = 2 × 2 × 2

• GCF = 2 • LCM = 24 (No)

4 a The two numbers are 30 and 20

b Common prime factors are 2 , 5 and 10

c GCF = 10 d LCM = 60

e NO

Quiz

1 a 2 b their product c 1

2 a 16 = 2 × 2 × 2 × 2 • 24 = 2 × 2 × 2 × 3

• GCF = 2 × 2 × 2 = 8

• LCM = 2 × 2 × 2 × 2 × 3 = 48

b ① 10 and 9 ② none ③ 1

④ 90 ⑤ yes

Lesson 3

Writing Expressions Using GCF

1 a 5,3,5,6 b 7 , 2 , 4

c 9, 2, 8, 8 d 9, 4, 6

2 a 6 b 5 c 8

3 GCF = 8 ⟶ 8 × (3 + 2) or (8 × 3) + (8 × 2)

Quiz

1. (a) 7,5 (b) 4, 6, 2, 2 (c) 3 (d) 1
2. (a) 3 (b) 4 × (3 + 2)

Lesson 4

Least Common Multiple Analysis

1. (a) $\frac{9}{10} + \frac{5}{12} = \frac{12}{14} = \frac{7}{6} = 1\frac{1}{6}$

(b) $\frac{7}{9} - \frac{3}{9} = \frac{4}{9}$

(c) $2\frac{9}{24} + 1\frac{20}{24} = 3\frac{29}{24} = 4\frac{5}{24}$

(d) $5\frac{16}{18} - 3\frac{9}{18} = 2\frac{7}{18}$

(e) $8\frac{3}{15} + 2\frac{5}{15} = 10\frac{8}{15}$

(f) $6\frac{8}{12} - 2\frac{3}{12} = 4\frac{5}{12}$

2. (a) $2\frac{3}{4} + 1\frac{1}{2} + 1\frac{1}{5} = 2\frac{15}{20} + 1\frac{10}{20} + 1\frac{4}{20}$

$= 4\frac{29}{20} = 5\frac{9}{20}$ hours

(b) $5\frac{1}{2} + 3\frac{3}{4} + 2 = 5\frac{2}{4} + 3\frac{3}{4} + 2 = 10\frac{5}{4}$

$= 11\frac{1}{4}$ pounds

(c) $25\frac{1}{2} - 16\frac{1}{4} = 25\frac{2}{4} - 16\frac{1}{4} = 9\frac{1}{4}$ pounds

(d) $4\frac{1}{2} - 3\frac{1}{4} = 4\frac{2}{4} - 3\frac{1}{4} = 1\frac{1}{4}$ hours

Quiz

1. (a) $5\frac{1}{6} + 3\frac{2}{6} = 8\frac{3}{6} = 8\frac{1}{2}$

(b) $9\frac{2}{4} - 2\frac{1}{4} = 7\frac{1}{4}$

(c) $7\frac{3}{4} - 3\frac{2}{5} = 7\frac{15}{20} - 3\frac{8}{20} = 4\frac{7}{20}$

(d) $7\frac{1}{3} + 3\frac{4}{5} = 7\frac{5}{15} + 3\frac{12}{15} = 10\frac{15}{15} = 11\frac{2}{20} = 11\frac{1}{10}$

2. (a) The total mass $= 3\frac{1}{2} + 4\frac{1}{4} = 3\frac{2}{4} + 4\frac{1}{4}$

$= 7\frac{3}{4}$ kg

(b) She has left $= 12 - 3\frac{1}{2} = 11\frac{2}{2} - 3\frac{1}{2}$

$= 8\frac{1}{2}$ meters

Unit 2

Lessons 1&2

Using a Number Line to Describe Data
Using a Number Line and Symbols to Compare Numbers

1. a 25 b -3 c -10 d 12 e -19 f -4
2. answer by yourself.
3. a -2 b 5 c -8 d 8 e -10 f 1 g -1 h 0
4. a < b > c < d > e > f > g > h = i =
5. a 7 b -6 c 15 d -12 e 0 f 45

Quiz

1. a 0 b -4 c 3
2. a -7 b -4 c <
3. The order: -30, -18, 0, 3, 11

Lessons 3&4

Analyzing Rational Numbers Using Models
Comparing and Ordering Rational Numbers

1. Answer by yourself.
2. a $\frac{75}{100}$ b $\frac{-45}{1}$ c $\frac{4}{1}$ d $\frac{0}{8}$ or $\frac{0}{5}$ e $\frac{16}{5}$ f $-\frac{15}{10}$
3. In order from the left: -7.25, -5.5, $-2\frac{1}{3}$, 2.5, $4\frac{1}{2}$, $7\frac{3}{4}$
4. a 0.8 b $\frac{3}{4}$ c -2.5 d 0 e -0.6 f $-3\frac{1}{7}$
5. a < b < c < d < e < f < g = h > i <
6. a ① Ascending: $-4, 0.6, 2\frac{3}{7}, 3\frac{5}{9}, 5\frac{3}{8}$
   ② Descending $5\frac{3}{8}, 3\frac{5}{9}, 2\frac{3}{7}, 0.6, -4$
   b ① Ascending: $-\frac{1}{4}, -0.2, \frac{1}{4}, 0.3, \frac{1}{2}$
   ② Descending: $\frac{1}{2}, 0.3, \frac{1}{4}, -0.2, -\frac{1}{4}$

Quiz

1. a rational number b $\frac{8}{9}$ c > d -4, -6
2. a -5.9 b -1 c rational d 0
3. The order: 7.7, $-3\frac{1}{5}$, -3.8, -7, $-7\frac{1}{2}$

Lessons 5&6

Exploring the Absolute Value
Comparing Absolute Values

1. a 10 b 4 c $\frac{2}{3}$ d $\frac{4}{7}$ e 2.05 f 12.5
2. a 9 b 15 c -1.2 d 11 e 6 or -6
3. a < b > c > d > e < f =
4. The order: -4, -3.4, |0.8|, 2.5, |-5.3|
5. a B, -22 < -16 b A c -4.8



1. a < b > c = d >
2. a 8 b 5 c 10 d -3
3. The order: $-\frac{1}{3}, \frac{2}{3}, 1\frac{1}{3}, \frac{9}{5}$
4. The order: $2\frac{1}{2}, \frac{1}{2}, 0.2, 0.02$

Unit 3

Lessons 1&2

Creating Expressions
Analyzing Expressions

1. a 2, 3, m b 2, –5, y c 3, $\frac{1}{3}$, a, b
   d 2, $-\frac{3}{7}$, n e 4, 6, x, y, z
2. a Numerical b Algebraic c Numerical
   d Algebraic e Algebraic
3. a a / 7 / 2, 4 b x / 5, 17 / 1 c y / $\frac{1}{5}$, 22 / 2
   e q , r , s / Non / 8 / Non / 0.2 , 0.6 , 0.8
   f Non / 8 / Non
4. a 3 / x, $\frac{3}{8}$ x b 4 / m , 2 m , 3 , 2
   c 2 / 16 x, 2 x d 4 / 7x, 2 x, 7x
5. a $\frac{1}{6}$ m b 7n

Quiz

1. a –5 b 5a, 2a c 3
2. a 9 + x b numerical expression. c 5
3. a 3 b 1 c 2

Lesson 3.

Writing Algebraic Expressions

1. a x + 5 b y – 3 c 4a
   d 2n e $\frac{m}{2}$ or $\frac{1}{2}$ m f $\frac{5}{t}$ or 5 ÷ t
2. a ① x plus 7 ② The sum of x and 7
   b ① x minus 3 ② x decreased by 3
   c ① The product of x and 8 ② 8 times x
   d ① x divided by 3 ② Third x
3. a 3m + 6 b 3a – 3 c $\frac{1}{2}$ y + 7
   d 2 (b + 6) e 2b + 6
4. a Sum of triple x and 2
   b 4 times y minus 6
   c Third x minus 4
   d 6 times the sum of a and 7
   e 3 times the difference between s and 2
5. a 3y – 12 b 4c
   c 14e + 2 d $\frac{d}{15}$

Quiz

1. a x decreased by 2
   b The sum of 7 and 5 times a
   c Double y subtracted from 3.6
2. a y-3 b 2 (x + 7) c x, –
3. a 4 b 1 c 2 d 3

Lesson 4

Order of Operations and Exponents

1. a 24 + 6 = 30 b 13 × 7 = 91
   c [1.5 × 20] - 15 = 30 – 15 = 15
   d 28 ÷ [4 × 3.5] = 28 ÷ 14 = 2
2. a 3 b 7 c 7 × 7 × 7 × 7 d 9
   e 8 f 1 g 0 h 1
   i 0 j 1 k 0
3. a 2 × 5 + 9 = 10 + 9 = 19
   b 64 ÷ 16 × 5 = 4 × 5 = 20
   c 20 × 9 – 5^2 × 4 = 20 × 9 – 25 × 4
   = 180 – 100 = 80
   d 10^2 × 3.69 = 100 × 3.69 = 369

Quiz

1. a 27 b 12 c 24
   d 3 e (32 ÷ 3) ÷ (8 – 1) = 35 ÷ 7 = 5
2. a 4 × 4 × 4 b 2 c >
   d 2^4 e 1

Lessons 5-7

Evaluating Algebraic Expressions
Applications on Algebraic Expressions
Determining Equivalent Algebraic Expressions

1 a) 25a b) 65b c) 34x + 5 d) 22 - 3y

2 a) 5 × 0.4 + 2 = 2 + 2 = 4

b) $9 \times 2 - 3^2 = 9 \times 2 - 8 = 18 - 8 = 10$

c) 28 + (5 + 2) + 7 = 28 + 7 + 7 = 4 + 7 = 11

d) $12 + (4^2 - 10) = 12 + (16 - 10) = 12 \div 6 = 2$

e) 23 × 3 + 6 = 8 x 3 ÷ 6 = 24 + 6 = 4

f) $6^2 + 3 \times (4 - 2) = 6^2 + 3 \times 2 = 36 + 3 \times 2$
= 12 × 2 = 24

3 a) 30y + 100 or 100 + 30 y

b) 30 × 3 + 100 = 90 + 100 = 190 pounds

4 Answer by yourself.

Quiz

1 a) 9k b) 7z c) 14 d) 2

2 a) 2 b) 3 c) 1

3 a) 6 b) 2 c) 6

Unit 4

Lesson 

Solving Equations

1 a) 4x = 8 , x = 2 b) x + 5 = 11 , x = 6

c) 3x = 12 , x = 4 d) x + 3 = 7 , x = 4

2 a) x + 7 − 7 = 15 − 7 , x = 8

b) a − 6 + 6 = 5 + 6 , a = 11

c) 4 + y − 4 = 6 - 4 , y = 2

d) $\frac{6m}{6} = \frac{18}{6}$, m = 3

e) $\frac{n}{5} \times 5 = 3 \times 5$, n = 15

f) $\frac{1}{4} t \times 4 = 2 \times 4$, t = 8

Quiz

1 a) x + 2 − 2 = 11 − 2 , x = 9

b) m − 7 + 7 = 9 + 7 , m = 16

c) 5 y ÷ 5 = 45 ÷ 5 , y = 9

d) $\frac{k}{8} \times 8 = 6 \times 8$, k = 48

2 a) 18 b) 6 c) 9

Lessons 2&3

Exploring & Solving Inequalities

1 a) x > 4 b) x < -3 c) x ≥ −1

d) x ≤ 5 e) x > 7 f) x ≤ −1

2 a) are greater than −5 b) are less than 1

c) are less than or equal −2

d) are greater than or equal 4

3

a) -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

b) -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

c) -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

d -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

e -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

f -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

4 a ✗ b ✗ c ✗ d ✓ e ✓

5 a ✗ b ✓ c ✗ d ✓ e ✗

Quiz

1 a All values greater than –5

b All values less than or equal 2

2 a $x > 1$ b $x < 6$ c $x > -3$

3 a $x > 2$ b $x > -1$ c 1

Unit 5

Lessons 

-The Relationship Between Dependent and Independent Variables
-Applications on Dependent and Independent Variables

1 a The number of study hours / the exam result

b level of education / The job

c The distance traveled / fuel consumption

d The number of chocolate bars / The amount paid

2

x	m	s	f
y	z	a	t

3 a $y = x + 6$

b x (Sameh) c y (Ahmed)

d $y = 12 + 6 = 18$ years

4

y = 3x	y = 4x	y = 6x	y = 8x
3 × 8 = 24	4 × 8= 32	6 × 8 = 48	8 × 8 = 64

Quiz

1 a x / y

b the amount of electricity / the value of the electricity bill.

c the number of points he gets / the number of times he hits the target.

2 a $y = 100x$

b the number of months "x"

c the total money she saved "y"

d $y = 6 \times 100 = 600$ pounds

Lesson 3

-Analyzing the Relationships Between Dependent and Independent Variables

1 a multiply by 8 b $y = x + 9$

c $y = \frac{x}{3}$ d multiply by 3 then add 7

e subtract 3 then divide by 2

2 a • 12 , 12 • Rule: add 2

• Equation: $y = x + 2$

b • 5 , 14 • Rule: add 5

• Equation: $y = x + 5$

c • 12 , 5 • Rule: divide by 3

• Equation: $y = x + 3$

d • 6 , 20 • Rule: multiply by 4

• Equation: $y = 4x$

3 a 13

• Rule: multiply by 3, then subtract 2

• Equation: $y = 3x - 2$

b 18

• Rule: divide by 3, then subtract 1

• Equation: $y = \frac{x}{3} - 1$

c 5

• Rule: multiply by 2, then add 2

• Equation: $x = 2x + 2$

d 2

• Rule: Subtract 1, then divide by 2

• Equation: $y = (x - 1) \div 2$

4 a $y = 2x$, $y = 2 \times 2.3 = 4.6$

b $y = x + 6$, $y = \frac{1}{5} + 6 = 6\frac{1}{5}$

c $y = 3x + 4$, $y = 3 \times 5 + 4 = 19$

Quiz

1 a $y = x + 8$ b $y = 3.2 - x$ c 35

2 a $y = 4x$ b $y = 2x + 5$ c 7

3 5 , 25

• Rule: multiply by 5, then add 5

• Equation: $y = 5x + 5$

Lesson 

Graphing Dependent and Independent Variables

1 • y: 3 , 5 , 7 , 8 , 9

• The equation is $y = x + 3$

• X axis : My number of rides

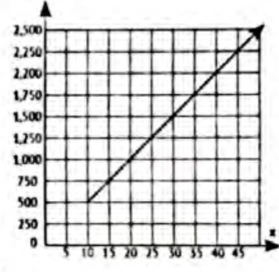
• Y axis : My friend's number of rides

2 y: 500 / 750 / 1000 / 1500 / 2250

• The equation is $y = 50x$

• X axis : The number of subscribers

• Y axis : The total value of subscriptions



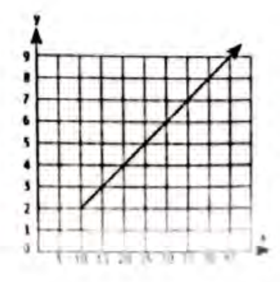
Quiz

1 a X b Y

c horizontal d Y

e The rate

2 2/ 3/ 4/ 6/ 9



Unit 6

Lesson 

Data and Statistical Questions

❶ ⓐ Statistical ⓑ Statistical
ⓒ Non-Statistical ⓓ Statistical
ⓔ Non-Statistical ⓕ Non-Statistical
ⓖ Statistical ⓗ Non-Statistical

❷ ⓐ Numerical ⓑ Categorical
ⓒ Categorical ⓓ Categorical
ⓔ Numerical ⓕ Categorical
ⓖ Numerical ⓗ Numerical



❶ ⓐ Numerical/ Categorical
ⓑ Numerical/ Categorical
ⓒ numbers ⓓ adjectives or word
ⓔ Statistical

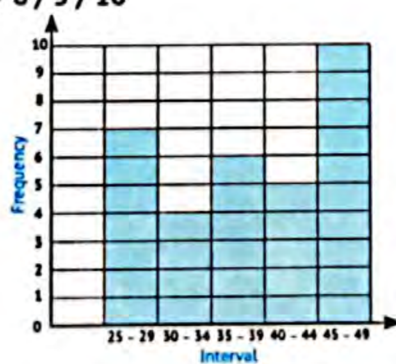
❷ ⓐ Favorite colors ⓑ Salaries
ⓒ lengths ⓓ types of pets
ⓔ non-statistical

Lessons 2&3

-Exploring Histograms
-Creating Histograms to Represent Data

❶ ⓐ histogram ⓑ Dot plots ⓒ bar graph
ⓓ Dot plots ⓔ histogram ⓕ bar graph

❷ 7 / 4 / 6 / 5 / 10



Quiz

❶ ⓐ 2 ⓑ 3 ⓒ 1

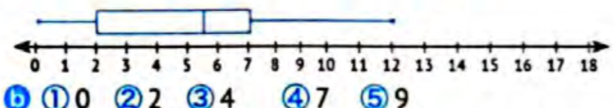
❷ 6 / 6 / 7 / 10 / 2

Lesson 

❶ ⓐ order: 2 , 4 , 5 , 9 , 9 median 5
ⓑ order: 0 , 2 , 5 , 7 , 8 ,11 median (5 + 7) ÷ 2 = 6
ⓒ order: 1, 2 , 3 , 3 , 6 , 8 , 9
median 3
ⓓ order: 0 , 2 , 5 , 5 , 6 , 7 , 8 , 11
median (5 + 6) ÷ 2 = 5.5

❷ ⓐ 1 ⓑ 5 ⓒ 8
ⓓ 11 ⓔ 13

❸ ⓐ ① 0 ② 2 ③ 5.5 ④ 7 ⑤ 12



ⓑ ① 0 ② 2 ③ 4 ④ 7 ⑤ 9



Quiz

❶ ⓐ 2 ⓑ 3 ⓒ 7
ⓓ 8 ⓔ 11

❷ ⓐ 1 ⓑ 4 ⓒ 9
ⓓ 13 ⓔ 17

Lesson 5

Applications on Graphs

❶ ⓐ ① 13 / ✗ / ✓ / ✗ ② 166 / ✗ / ✗ / ✓
③ 1 / ✓ / ✗ / ✗ ④ 1 / ✗ / ✓ / ✗
⑤ 2 / ✗ / ✓ / ✗ ⑥ 100 / ✗ / ✗ / ✓
⑦ 96 / ✓ / ✗ / ✗

ⓑ ① Exactly how many movies are 100 minutes long?

② How many films are their duration graphically represented?

③ What is the mediator?



❶ ⓐ 3 ⓑ 1 ⓒ 2

❷ ⓐ ① how many students were absent for 5 days?

② what is the common day number of absences?

ⓑ ① what the what is the most frequency interval?

② what the what is the least frequency interval?

ⓒ ① what is the median?

② what is the first quartile?

Unit 7

Lessons 

-Exploring the Balance of Data Sets
-Interpreting Mean

❶ ⓐ 6 ⓑ 17 ⓒ 7 ⓓ 7

❷ (8 + 9 + 12 + 7 + 3 + 9) ÷ 6 = 8

❸ ⓐ (40 + 38 + 36 + 34 + 32) ÷ 5 = 36

ⓑ (25 + 12 + 3 + 18) ÷ 4 = 14.5

ⓒ (3 + 3 + 5 + 7 + 2 + 4 + 7 + 3) ÷ 8 = 4.25

ⓓ (52 + 98 + 60) ÷ 3 = 70

❹ ⓐ • 7 x 6 = 42 • x + 37 = 42

• x = 42 - 37 = 5

ⓑ • Sum = 6 x 5 = 30

• x + 26 = 30 • x = 30 - 26= 4

Quiz

❶ ⓐ 50 ⓑ 5 ⓒ 6

ⓓ 6 ⓔ 45

❷ ⓐ 7 ⓑ 6

Lesson 3

Exploring Median: Mode and Outliers

❶ ⓐ 8 ⓑ 7 ⓒ plane

ⓓ 2 ⓔ none ⓕ 12

ⓖ 10,13

❷ ⓐ 19 ⓑ 2 ⓒ none

ⓓ 2,3 ⓔ none ⓕ 11

❸ ⓐ decrease ⓑ increased

ⓒ stay the same ⓓ stay the same

❹ ⓐ Median ⓑ Mean

ⓒ both

Quiz

1. a) 2 b) 6 c) 7
   d) 23
1. a) 6 b) 4 c) 4
   d) 11 e) Median

Lesson 4

Exploring Range

1. a) 7 b) 61 c) 72
   d) 11 e) 44
2. a) 19 / 10 / 9 b) 10 / 1 / 9
   c) 18 / 9 /9 d) 30 / 20 / 10
3. a) 30 / 22 / 8 b) 6 / 3 / 3

Quiz

1. a) 14 b) 12 c) 13
   d) 12 e) 2
2. a) 8 b) 6 c) 0
2. a) 8 - 1 = 7 b) 4

Guide Answers — Exercise Book

Exercises on Unit 1

Lesson 1

1. a) 15 b) 29 c) 26
d) 93 R 2 e) 295 f) 472 R2 g) 705
2. a) 24 b) 11 c) 15
d) 27 R24 e) 105 f) 214
3. a) 348 ÷ 12 = 29
b) 132 ÷ 12 = 11 trays.
c) 1875 ÷ 25 = 75 pounds,
75 × 36 = 2700 pounds.
d) 163500 – 85500 = 78000 pounds,
78000 ÷ 24 = 3250 pounds.
e) 456 + 419 = 875 students,
875 ÷ 25 = 35 students.

Assessment 1
on Lesson (1)

1. a) 35 b) 6048 c) 4
d) 1998 e) 3479
2. a) 43 b) 27 c) 1905 R3
2. a) 24 × 50 = 1200 pupils
b) 300 ÷ 12 = 25 rooms

Lesson 2

1. a) GCF = 2 , LCM = 24
b) GCF = 6 , LCM = 72
c) GCF = 5 , LCM = 60
d) GCF = 1 , LCM = 36
2. a) prime factors 6 = 2 , 3 , 4 = 2 ,2
GCF = 2 , LCM = 12 , (NO)
b) prime factors 15 = 3 , 5 , 6 = 2 ,3
GCF = 3 , LCM = 30 , (NO)
c) prime factors 8 = 2 , 2 , 2 , 9 = 3 ,3
GCF = 1 , LCM = 72 , (Yes)
d) prime factors 12 = 2 ,2 , 3 , 14 = 2 ,7
GCF = 2 , LCM = 84 , (NO)
e) prime factors 18 = 2 , 3 ,3 , 9 = 3 ,3
GCF = 9 , LCM = 18 , (NO)
f) prime factors 8 = 2 , 2 , 2 , 21 = 3 ,7
GCF = 1 , LCM = 168 , (Yes)
g) prime factors 9 = 3 , 3 , 10 = 2 ,5
GCF = 1 , LCM = 90 , (Yes)
h) prime factors 15 = 3 , 5 , 8 = 2 ,2,2
GCF = 1 , LCM = 120 , (Yes)
3. a) ① 30 and 42 ② 3 , 2
③ 6 ④ 210 ⑤ (No)
b) ① 24 and 16 ② 2 , 2 , 4
③ 8 ④ 48 ⑤ (No)
c) ① 20 and 8 ② 2 , 2
③ 4 ④ 40 ⑤ (No)
d) ① 20 and 9 ② 1
③ 1 ④ 180 ⑤ (Yes)
e) ① 16 and 40 ② 2 , 2 , 2
③ 8 ④ 80 ⑤ (No)
4. a) 2 b) 2 c) 2
d) 3 e) prime number
f) 11 g) 2, 3, 5, 7
h) 3,7 i) 18 j) 1
k) their product
5. a) 1 b) 59 c) 30
d) has only two factors e) prime
f) 2 × 2 × 3 g) 8 h) 1
i) 1 j) their product
k) their product l) 1 m) 35
n) 72 o) 1

Assessment 2

on Lesson (2)

1. a) 11, 13, 17, 19 b) 2 × 3 × 3
c) 42 d) 1 e) 0
2. a) 1 b) their product
c) 1 d) 9
e) 9 and 4
3. • GCF = 4 • LCM = 48

Lesson 3

1. a) 7,5,7,2 b) 8,2,8,9 c) 8,5,3
d) 3,3,7 e) 2,4,5,5 f) 8,7,6,6
g) 7,5,1 h) 2,4,3
2. • GCF = 9 no
• 18 ÷ 9 = 2 kg of oranges
• 27 ÷ 9 = 3 kg of apples
3. • GCF = 4 , 4 groups
• 3 doctors , 7 nurses
4. • 12 groups • 2 pens
• 3 notebooks
5. 6 bags
6. 5 × (5 + 3) = 5 × 5 + 5 × 3

Assessment 3

on Lesson (3)

1. a) (4 × 2) + (4 × 9) b) 6 × (3 + 2)
c) 7 d) 6 e) 0
2. a) 4 × (4 + 3) b) 3 × (3 + 7)
3. • 7 groups • 3 pens
• 5 notebooks

Lesson 4

1. a) $1\frac{7}{15}$ b) $14\frac{1}{6}$
c) $\frac{15}{16}$ d) $14\frac{9}{20}$
e) $3\frac{7}{24}$ f) $\frac{1}{12}$
g) $\frac{13}{18}$ h) $3\frac{31}{60}$
i) $2\frac{8}{15}$ j) $1\frac{2}{3} - 1\frac{3}{5} = \frac{1}{15}$
2. $3\frac{1}{2} + 4\frac{1}{4} = 7\frac{3}{4}$ kg
3. $9\frac{1}{2} + 5\frac{1}{4} + 4 = 18\frac{3}{4}$ pounds
4. $3\frac{3}{4} - 2\frac{1}{5} = 1\frac{11}{20}$ kg
5. $4\frac{1}{2} - 1\frac{1}{3} = 3\frac{1}{6}$ hr
6. a) $\frac{1}{6} + \frac{2}{8} + \frac{1}{4} + \frac{1}{3} = 1$ pizza
b) 4 − 1 = 3 pizzas
7. $15 - (4\frac{1}{2} + 6\frac{2}{5}) = 4\frac{1}{10}$ km
8. a)
① $\frac{3}{4} + \frac{2}{4} + \frac{1}{4} + \frac{2}{4} + \frac{3}{4} = 2\frac{3}{4}$ package
② $4 - 2\frac{3}{4} = 1\frac{1}{4}$ package
b)
① $\frac{3}{8} + \frac{2}{8} + \frac{5}{8} + \frac{7}{8} = 2\frac{1}{8}$ package
② $4 - 2\frac{1}{8} = 1\frac{7}{8}$ package
c)
① $\frac{3}{8} + \frac{1}{4} = \frac{5}{8}$ package
② $2 - \frac{5}{8} = 1\frac{3}{8}$ package

Assessment 4

on Lesson (4)

1. a) $1\frac{1}{2}$ b) $4\frac{2}{15}$
c) $2\frac{1}{8}$ d) $1\frac{1}{6}$
2. a) $4\frac{1}{6}$ b) $\frac{5}{8}$
c) $3\frac{7}{12}$
3. a) $15\frac{1}{2} - (4\frac{1}{2} + 5\frac{1}{2}) = 5\frac{1}{2}$ pounds
b) ① $\frac{1}{2}$ ② $\frac{7}{16}$

Exercises on Unit 2

Lessons 1&2

1. a -12 b 40 c -10
   d -50 e 5 f -20
   g 16 h 3 i -3
   j -150
2. a -1 b -6 c 7
   d -8 e -3 f 3
   g 4 h 0
3. Answer by yourself.
4. The next : 11, -6, 1, -4, 10
   The previous : 9, -8, -1, -6, 8
5. a < b < c >
   d > e > f <
   g > h < i >
   j = k = l <
6. a Ascending: -6, -3, 0, 5, 8
   Descending: 8, 5, 0, -3, -6
   b Ascending: -350, -5, 45, 63, 120
   Descending: 120, 63, 45, -5, -350
   c Ascending: -3, -1, 0, 1, 3
   Descending: 3, 1, 0, -1, -3
7. a 9 b 3 c 12
   d -7 e -8 f -25
   g 0 h 1 i -1
8. a -15 b 25 c -4
   d -1 e 12 f -10
   g 1 h 1 i 0
   j the same distance , opposite
9. a -4 b 0 c -15
   d 12 e 0 f -6
   g -1 h 0 i less than
   j greater than

Assessment 1
on Lessons (1&2)

1. a -5 b -1 c -8
   d < e 8
2. a 6 b -2, -1, 0, 1 c -8
   d 1 e -1, 0, 1, 2
3. -32, -3, 0, 2, 9
4. Draw by yourself.

Lessons 3&4

1. a ✓,✓,✓,✓ b ✗,✗,✓,✓
   c ✗,✓,✓,✓ d ✗,✗,✗,✓
   e ✗,✗,✗,✓ f ✗,✗,✗,✓
   g ✓,✓,✓,✓ h ✗,✗,✗,✓
   i ✗,✗,✗,✓ j ✗,✗,✓,✓
2. Draw by yourself.
3. $\frac{5}{2}, -\frac{4}{5}, \frac{5}{1}, -\frac{7}{2}, \frac{11}{4}$
   $-2.5, 0.8, -5, 3\frac{1}{2}, -2\frac{3}{4}$
4. a < b < c <
   d < e < f <
   g < h > i >
   j = k > l <
5. a Ascending : $-5.5, -1\frac{3}{5}, 2\frac{2}{3}, 3.7, 7\frac{1}{4}$
   Descending : $7\frac{1}{4}, 3.7, 2\frac{2}{3}, -1\frac{3}{5}, -5.5$
   b Ascending : $-0.82, -\frac{1}{2}, 0.25, \frac{1}{2}, \frac{2}{3}$
   Descending : $\frac{2}{3}, \frac{1}{2}, 0.25, -\frac{1}{2}, -0.82$
   c Ascending : $-5.5, -5\frac{1}{4}, -5\frac{1}{5}, 2.2, 2\frac{3}{4}$
   Descending : $2\frac{3}{4}, 2.2, -5\frac{1}{5}, -5\frac{1}{4}, -5.5$
6. a rational number b even number
   c natural number d $\frac{3}{4}$
   e $-\frac{6}{1}$ f $-4\frac{2}{3}$
   g 0.5 h >
   i $-\frac{8}{4}$ j $\frac{3}{2}$

Assessment 2
on Lessons (3&4)

1. a $-4\frac{1}{2}$ b negative integer
   c rational d 5 e -2, -3
2. a -5.9 b -5 , -6
   c integer , rational d $-\frac{5}{2}$
   e -1.75
3. $7.7, 7\frac{1}{2}, 7, -3\frac{1}{5}, -3.8$

Lessons 5&6

1 (a) 5 (b) 15 (c) 6
(d) 45 (e) $\frac{7}{9}$ (f) $7\frac{3}{5}$
(g) $\frac{3}{4}$ (h) $7\frac{2}{3}$ (i) 0.03
(j) 0.7 (k) 7.04 (l) 6.5

2 (a) < (b) > (c) =
(d) = (e) = (f) >
(g) > (h) > (i) >
(j) < (k) < (l) >
(m) = (n) < (o) > (p) >

3 (a) Ascending: –17 , –9 , | –3 | , 8, | 12 |
Descending: | 1 2| , 8 , | –3 | , –9 , –17
(b) Ascending: –4.8 , –2.7 , | –1.5 | , | 6.7 | , 7.3
Descending: 7.3 , | 6.7 | , | –1.5 | , –2.7 , –4.8
(c) Ascending: $-\frac{3}{4}, -\frac{5}{8}, |\frac{1}{4}|, |-\frac{1}{2}|, \frac{3}{4}$
Descending: $\frac{3}{4}, |-\frac{1}{2}|, |\frac{1}{4}|, -\frac{8}{5}, -\frac{2}{4}$

4 (a) 5 or -5 (b) 7 (c) 9
(d) -5 (e) -4 (f) 18
(g) Moscow, < (h) A (i) -7.2

5 (a) ① Wael , Tamer and Mohamed
② Tariq, Sameh and Fouad
③ Fouad
④ Tariq
(b) Tamer, Wael , Mohamed , Fouad , Sameh , Tariq

Assessment 3
on Lessons (5&6)

1 (a) 1.5 (b) 6 (c) 2.7 (d) 0
(e) farther from zero

2 (a) 5 or –5 (b) 3.5 (c) 9
(d) same (e) 0.7

3 $0.75, |-\frac{1}{2}|, |0.25|, -\frac{1}{8}, -\frac{1}{4}$

4 (a) < (b) > (c) < (d) <

Exercises on Unit 3

Lessons 1&2

1 (a) ex (b) 2 ,5, x (c) 2, –3, y
(d) 3 , $\frac{1}{5}$, x,y (e) 2 , $-\frac{2}{8}$, m (f) 4 , 8 , a,b,c
(g) 2,7, r (h) 4 , 5 , x,y,z (i) 2 , 6 , n
(j) 3 , $\frac{3}{7}$, k,m (k) 3 , 23 a,b (l) 3 $\frac{1}{6}$, y,z

2 (a) numerical (b) numerical (c) algebraic
(d) numerical (e) algebraic (f) algebraic
(g) algebraic (h) algebraic (i) numerical
(j) numerical (k) algebraic (l) algebraic
(m) numerical (n) numerical (o) algebraic
(p) algebraic

3 (a) a ,8 ,5 (b) x, –5 ,9
(c) a,b , 7 , 3,4
(d) x , 15,2.5 , 6
(e) y , 63 , 5
(f) r , 1.3,7 , 8
(g) m,h , 12,-5 , 0.2 , –0.3
(h) p, c , 4,2 , 3,15
(i) w , 2,3,0.2 , 6
(j) q , 7,3,2.4 , 2.5

4 (a) 1 , none (b) 1 , none
(c) 1 , none (d) 1 , none
(e) 2 , 7x , 3x (f) 2 , 8a ,5a
(g) 2 , none (h) 4 , 15 , 3
(i) 4 / 36,12 / $\frac{1}{2}$ a , a (j) 4 , 3b , 5b , 2b

5 (a) 12 – d (b) x + 3
(c) $\frac{1}{5}$w (d) x + 10

6 (a) 2 (b) –3 (c) a
(d) 3 (e) 2 (f) 5y , 2y
(g) none (h) 9 (i) 5,3
(j) m – 10

Assessment 1

on Lessons (1&2)

1 (a) x (b) 3 (c) 2
(d) 6x , 2x (e) 3.2

2 (a) none (b) 5 , 3 (c) 60 – x
(d) 3 (e) $\frac{2}{3}$, 4

3 (a) 4 (b) 5x , 6x (c) 5,2,6 (d) 3

Lessons 3

1 (a) 36 + z (b) x – 5 (c) a + 9
(d) 3b (e) 7.5p (f) y – 14
(g) h + 6 (h) 9 + r (i) a + 3.5
(j) $\frac{1}{2}$ q + 4 (k) 2w – 7 (l) 2v – 3
(m) 2 (g + 6) (n) 3 (s – 2) (o) 3a + 5
(p) x + 7 (q) m + 12 (r) x + 3

2 (a) 9 more than a
(b) 6 less than b
(c) f less than 7.5
(d) 12 multiplied by y
(e) 8 divided by s
(f) k divided by r
(g) add 6 to 3 times x
(h) 2 times x less than 7
(i) half the sum of m and 3
(j) 5 times 3 less than c

3 (a) x – 5 (b) x + 10 (c) 2 x – 3
(d) 3y – 2 (e) 3 (m + 12) (f) $\frac{1}{2}$ (a – 7)
(g) x + 5 (h) x,+

4 (a) 3 (b) 1 (c) 4 (d) 2

Assessment 2

on Lesson (3)

1 (a) the sum of 3 and the quotient of a and 5
(b) multiply m by 6 (c) 3b
(d) y – 3 (e) p + 4

2 (a) (m + 18) ÷ 3 (b) b + 1
(c) 4s (d) 35 – w (e) x – 120

3 $\frac{1}{15}$ t

Lesson 4

1 (a) 4 (b) 3 (c) 3
(d) 8 (e) 2^4 (f) 6^3
(g) 7 × 7 (h) 6 × 6 × 6 × 6 (i) 10 × 10
(j) 1×1×1×1×1 (k) 5 × 5 × 5 (l) 2 × 2

2 (a) 25 (b) 27 (c) 32
(d) 1 (e) 1 (f) 1000
(g) 0 (h) 0 (i) 1
(j) 1 (k) 1 (l) 1

3 (a) 34 (b) 14 (c) 12
(d) 25 (e) 10 (f) 19
(g) 9 (h) 12 (i) 22

4 (a) 18 (b) 3 (c) 24
(d) 5 (e) 10

5 (a) 22 (b) 7 (c) 20
(d) 9 (e) 3 (f) 3
(g) 2 (h) 3 (i) 215
(j) 2 (k) 9 (l) 74

6 (a) 32 (b) 5 (c) 3 (d) 76

7 (a) 4 × 4 (b) 1 (c) 1
(d) 2^5 (e) 5^3 (f) 0
(g) 1 (h) 3 × 3 × 3 × 3 (i) =
(j) > (k) 19 (l) 800 (m) 3^3

8 (a) base , power (b) base , power
(c) 4^2 (d) 8^3 (e) 6^3
(f) 7^2 (g) 4^5 (h) 6 , 4
(i) 4 (j) 4

Assessment 3

on Lesson (4)

1 (a) 3 × 3 (b) 1 (c) =
(d) 425 (e) 2

2 (a) 0 (b) 1 (c) 3
(d) 5 (e) 8

3 (a) 30 (b) 9 (c) 9 (d) 16

Lessons 5-7

1 (a) 8x (b) 12y (c) 7 z
(d) 50m + 15 (e) 6n + 3 (f) 300 – 9p
(g) 3q + 6

2 a) 33 b) 1 c) 3.9
d) 5 e) 3 f) 3

3 a) 34 b) 21 c) 11
d) 21 e) 7 f) 4
g) 21 h) 0

4 a) 11 b) 22 c) 2 d) 12

5 a) $10 + 5h$ b) 35 pounds

6 a) $10p - 325$ b) 175 pounds

7 a) Not equivalent b) Equivalent
c) Not equivalent d) Equivalent
e) Not equivalent

Assessment 4

on Lessons (5-7)

1 a) 120m b) $5d + 20$ c) 15 d) 3
e) putting the exponent in the simplest form, subtraction, multiplication, addition.

2 a) 4 s b) 45 c) 81
d) not equal e) 12

3 a) $5k + 6$ b) 26

Exercises on Unit 4

Lesson 1

1 a) $x + 2 = 12$, $x = 10$
b) $x + 1 = 7$, $x = 6$
c) $3x = 12$, $x = 4$
d) $2x = 12$, $x = 6$
e) $5x = 10$, $x = 2$
f) $x + 6 = 9$, $x = 3$
g) $x + 9 = 13$, $x = 4$
h) $8x = 8$, $x = 1$

2 a) 3 b) 5 c) 2
d) 14 e) 4 f) 7
g) 12 h) 20

3 a) 5 b) 11 c) 2
d) 9 e) 4 f) 3
g) 5 h) 3

Assessment 1

on Lesson (1)

1 a) 7 b) 2 c) 7
d) 3 e) 18

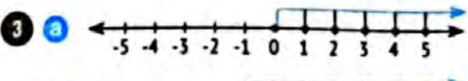
2 a) $3x = 15$, $x = 5$
b) $x + 1 = 5$, $x = 4$

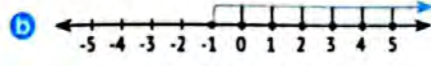
3 a) 5 b) 11
c) 7 d) 175

Lessons 2&3

1 a) $x > -1$ b) $x < 2$ c) $x > -9$
d) $x < 2$ e) $x \geq 6$ f) $x \leq -8$
g) $x \leq 4$ h) $x \geq -2$ i) $x < 0$
j) $x > 0$ k) $x \geq 0$ l) $x > 0$
m) $x \geq 0$ n) $x \leq 0$

2 a) more than 9 b) more than −5
c) less than 2 d) less than −7
e) less than or equal to −3
f) less than or equal to 4
g) more than or equal to 3
h) more than or equal to 0

3 a)


b)


c) -5 -4 -3 -2 -1 0 1 2 3 4 5

d) -5 -4 -3 -2 -1 0 1 2 3 4 5

e) -5 -4 -3 -2 -1 0 1 2 3 4 5

f) -5 -4 -3 -2 -1 0 1 2 3 4 5

g) -5 -4 -3 -2 -1 0 1 2 3 4 5

h) -5 -4 -3 -2 -1 0 1 2 3 4 5

4 a) $x > -1$ b) $x < 5$ c) $x \leq -7$
d) $x \geq 3$ e) $x < 0$ f) $x \leq 0$
g) 3 does not belong to the solution set on and of then
h) each including all values to the left of 4
i) −9.5 j) 6 k) $x \leq 7$

5 **a** ① both of them include numbers to the left of −8 on the number line.

② −8 does not belong to the solution set of the inequality " x < −8" and −8 does not belong to the solution set of the inequality " x < −8"b.

b ① −8 does not belong to the solution set of the inequality of any of them.

② x ⩾ −8 has all numbers to the right of −8 and x ⩽ −8 has all numbers to the left of −8.

c ① non algebraic.

② −8 is the solution of " x = −8" and −8 does not belong to the solution set of the inequality " x < −8".

6 **a** x < 3 **b** x > −1 **c** x > 2

d x > 2 **e** x > −6 **f** x < 5

Assessment 2

on Lessons (2&3)

1 **a** x > −5 **b** less than **c** x > 0

d −3 **e** −2

2 **a** (number line: −4 −3 −2 −1) **b** (number line: −3 −2 −1 0 1 2)

c (number line: −2 −1 0 1 2 3 4)

3 **a** x ⩾ −4 **b** x ⩽ 5 **c** x ⩾ 0

Exercises on Unit 5

Lessons 1&2

1 **a** Dependent , Independent

b Independent , Dependent

c Dependent , Independent

d Dependent , Independent

e Independent , Dependent

f Independent , Dependent

g Independent , Dependent

h Independent , Dependent

i Independent , Dependent

2 **a** Independent : r,s,z,x

Dependent: e,b,m,y

b Independent : a,t,p,m

Dependent: b,f,z,w

3 **a** y = 9x **b** x

c y **d** 54

4 **a** y = x + 15 **b** x

c y **d** 135

5 **a** y = x − 50 **b** x

c y **d** 370

6 **a** y = x + 3 **b** x

c y **d** 140 , 120 , 90 , 70 , 60

7 **a** x **b** a

c ① the number of books

② the price

d ① the amount of flour

② the number of baked

e what Ahmed saves each month , what Ahmed saves in a full year.

Assessment 1

on Lessons (1&2)

1 **a** w **b** a

c distance traveled

d the number of seats the theatre can accommodate.

e the number of correct answers.

2 **a** y = 150x **b** x , y **c** 1800

3 **a** y = 90x **b** x **c** y

d 3150

Lesson 3

1 **a** add 4 **b** subtract 7

c y = 5x **d** y = x ÷ 7

e multiply by 2 , then add 3

f divide by 2 , then add 4

g y = 2 (x + 7) **h** y = (x + 6) + 3

i y = 5 x −2 **j** y = x + 4 − 3

k subtract 2 , then multiply by 4

l subtract 9, then divide by 4

❷ ⓐ • x = 5 R: subtract 5
• y = 7 eq: y = x – 5

ⓑ • x = 4 R: multiply by 3
• y = 18 eq: y = 3x

ⓒ • x = 6 R: multiply by 4
• y = 20 eq: y = 4x

ⓓ • x = 5 R: multiply 5 then
• y = 23 eq: y = 5 x + 3

ⓔ • x = 9 R: subtract 2 then multiply 3
• y = 12 eq: y = (x – 2) × 3

ⓕ • x = 18 R: Divide de 2 then subtract 3
• y = 4 eq: y = x ÷ 2 – 3

ⓖ • x = 25 R: subtract 1 then divide
• y = 4 eq: y = (x – 1) ÷ 3

❸ ⓐ y = x + 3.1 , y = 6

ⓑ y = 2x , 16

ⓒ $y = \frac{1}{3}x$, 5

ⓓ y = 8 – x , 4.5

ⓔ add 5 then multiple by 3 , 21

ⓕ subtract from 9 then multiply by 2 , 12

❹ ⓐ y = 9 – x ⓑ y = 2x + 5

ⓒ y = 3 (x + 6) ⓓ divide by 3

ⓔ subtract 3 then divide by 2

ⓕ multiply by 5 then subtract 2

ⓖ 22 ⓗ 0

ⓘ y = (x + 1) × 2



Assessment 2

on Lesson (3)

❶ ⓐ y = x + 4 ⓑ multiply by 5

ⓒ 18 ⓓ $y = \frac{1}{2}x + 5$

❷ ⓐ y = (x + 4) ÷ 3 , x , y , 3

ⓑ y = x ÷ 2 - 1 , x , y , 3

ⓒ subtract 5 then multiply by 2 , x , y , 4

ⓓ multiply by 3 then add 4 , x , y , 4

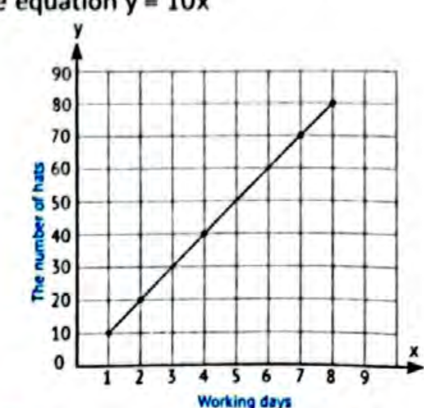
❸ 7 , 13 , 6 , 7 , 21 , 1 , 9 , 19 , 4

Lesson 

❶

x	1	2	4	7	9
y	10	20	40	70	90

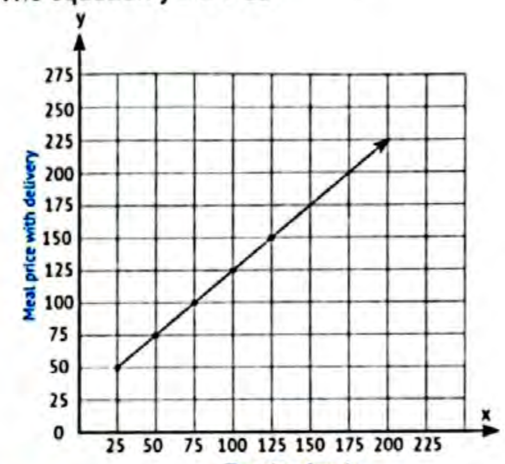
The equation y = 10x



❷

x	25	50	75	100	125
y	50	75	100	125	150

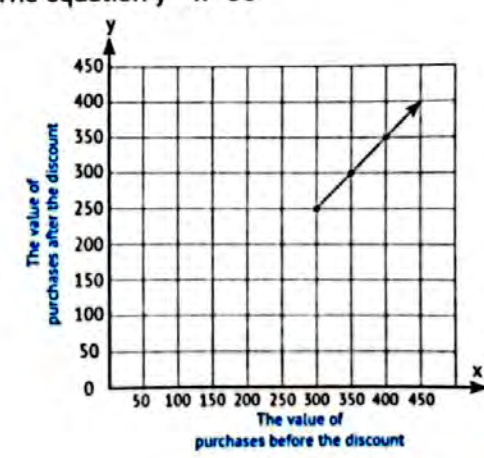
The equation y = x + 25



❸

x	300	350	400	450
y	250	300	350	400

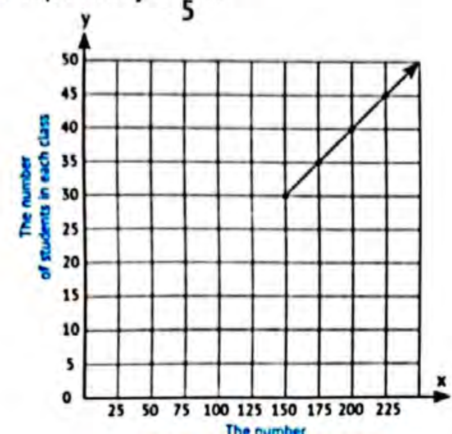
The equation y = x - 50



4

x	150	175	200	225
y	30	35	40	45

The equation $y = \frac{1}{5}x$



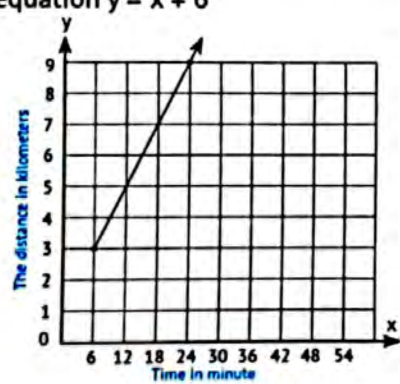
Assessment 3

on Lesson (4)

1

x	6	12	18	24
y	1	2	3	4

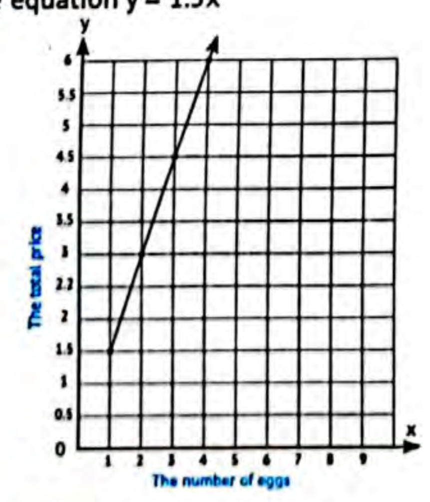
The equation $y = x + 6$



2

x	1	2	3	4
y	1.5	3	4.5	6

The equation $y = 1.5x$



Exercises on Unit 6

Lesson 

1. a) Non b) Statistical
   c) Non d) Non
   e) Non f) Non
   g) Statistical h) Non
   i) Statistical j) Statistical
2. a) Numerical b) Categorical
   c) Categorical d) Numerical
   e) Numerical f) Numerical
   g) Categorical h) Numerical
   i) Numerical j) Categorical
3. a) Categorical, Numerical
   b) Numerical, Categorical
   c) Numerical d) Categorical
   e) Non-statistical, Statistical
   f) Non-statistical, Statistical
   g) Numerical h) Numerical
   i) Categorical j) Categorical/numerical
4. a) result in a lot of different answer
   b) favorite color
   c) favorite TV show
   d) ages e) salaries
   f) weights g) heights
   h) names i) types of pets

Assessment 1

on Lesson (1)

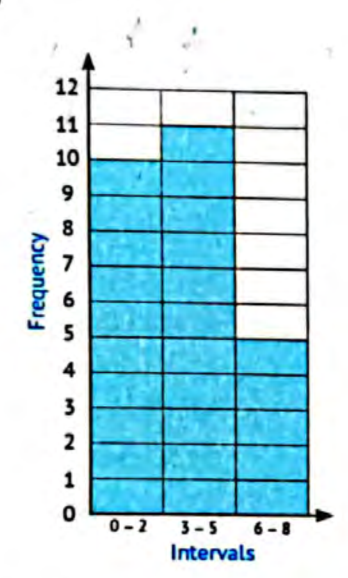
1. a) numbers b) words
   c) non statistical d) statistical
   e) categorical
2. a) Non-statistical b) Categorical
   c) Non-statistical d) Categorical
   e) Non-statistical f) Numerical
   g) Numerical h) Non-statistical

Lessons 2&3

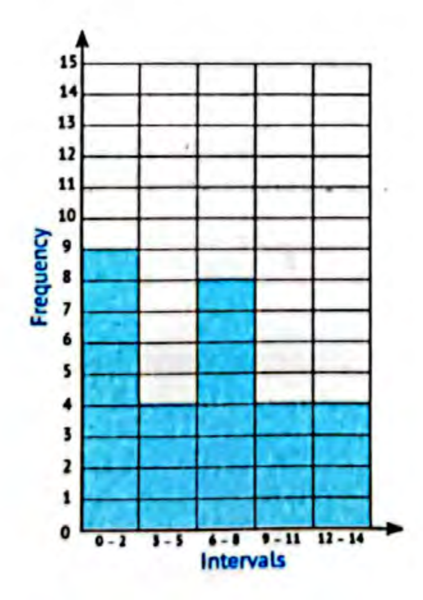
1.
   - a) bar graph
   - b) histogram
   - c) bar graph
   - d) dot plots
   - e) histogram
   - f) histogram
   - g) bar graph
   - h) dot plots
   - i) dot plots
   - j) histogram
   - k) histogram

2. 8,14,6,18,10

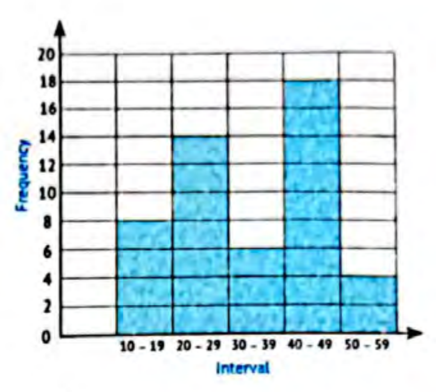
3. 10 ,11,5



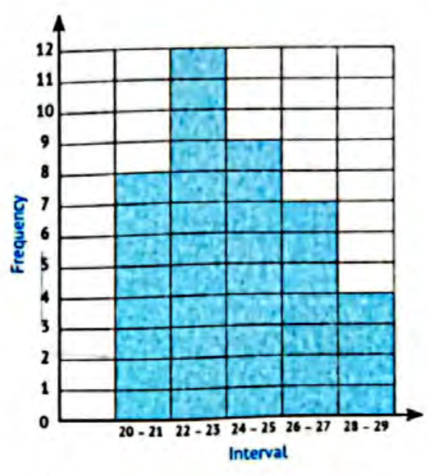
4. 9 ,4 ,8 ,4 ,4



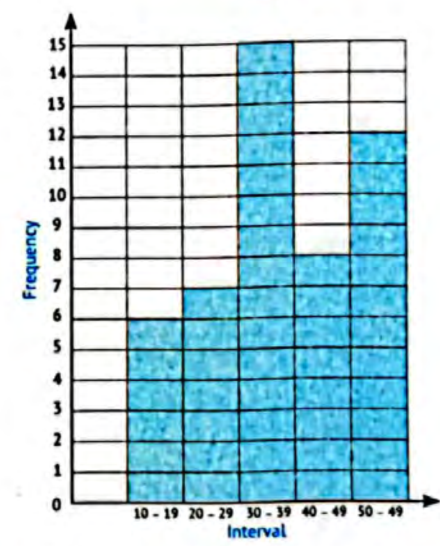
5.



6.



7.



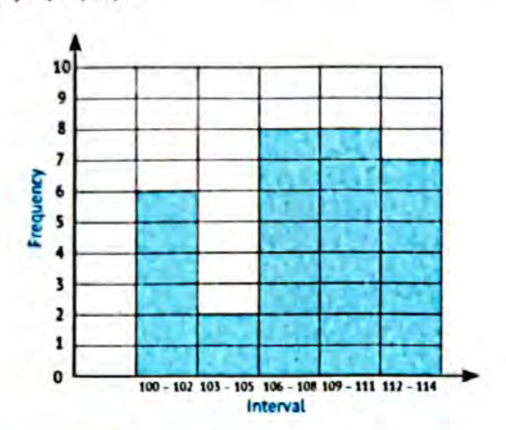
8.
   - a) histogram
   - b) dot plots
   - c) bar graph
   - d) all
   - e) each information is represent by a point
   - f) each bar represent a number or one categorical.
   - g) the bars must touch
   - h) bars are used to represent data
   - i) both of bar graph and histogram
   - j) all



Assessment 2

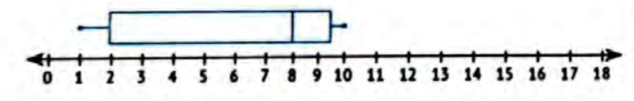
on Lessons (2&3)

1. a) histogram b) bar graph c) all
   d) can display numerical and categorical data
2. 6, 2, 8, 8, 7

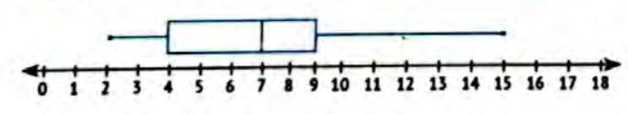


Lesson 4

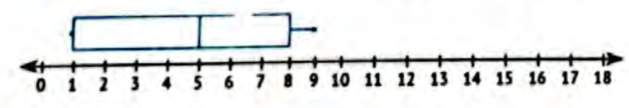
1. a) the central tendency b) 6 c) 6
   d) 3 e) 6 f) 2,7
2. a) ① 2 ② 4 ③ 10 ④ 15 ⑤ 18
   b) ① 1 ② 3 ③ 12 ④ 14 ⑤ 16
   c) ① 4 ② 5 ③ 7 ④ 13 ⑤ 15
3. a) ① 1 ② 2 ③ 8 ④ 9.5 ⑤ 10



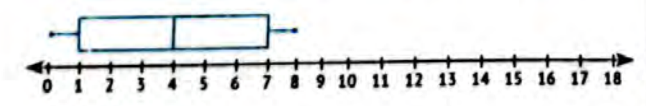
   b) ① 2 ② 4 ③ 7 ④ 9 ⑤ 15



   c) ① 1 ② 1 ③ 5 ④ 8 ⑤ 9



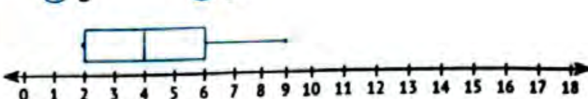
   d) ① 0 ② 1 ③ 4 ④ 7 ⑤ 8



Assessment 3

on Lesson (4)

1. a) 8 b) 4 c) 1
   d) 8 e) 3, 8
2. ① 2 ② 4 ③ 7
   ④ 9 ⑤ 10
3. ① 2 ② 6 ③ 10
   ④ 13 ⑤ 16
4. ① 2 ② 2 ③ 4
   ④ 6 ⑤ 9



Lesson 5

1. a) ② b) ③ c) ①
2. a) box plot b) box plot
   c) box plot d) box plot
   e) box plots f) dot plots
   g) dot plots h) dot plots
   i) dot plots j) histogram
   k) histogram l) dot plots
   m) dot plots n) box plots
   o) histogram
3. a) ① 5, box plot ② 140, box plots
   ③ 0, histogram ④ 300, box plot
   ⑤ 4, histogram
   b) ①, ② answer by yourself
4. a) ① 4, dot plots ② 152, box plots
   ③ 140, both ④ 159, both
   ⑤ 7, dot plots
   b) answer by yourself
5. histogram

Assessment 4

on Lesson (5)

1. a) ② b) ③ c) ①
2. a) 95, dot plots b) 0, dot plots
   c) 30, dot plot d) 8, histogram
   e) 6, histogram

Exercises on Unit 7

Lessons 1&2

1. a 5 b 13 c 6 d 7
   e 15 f 8 g 15 h 6
   i 16 j 24
2. a 5 b 5.5 c 4 d 3
   e 3 f 50
3. 126
4. 92
5. 24
6. 2
7. 3
8. a 23.25 b 4 c 10 d 1
   e 8 f 9 g 48
9. a 7 b 4 c 24
   d 5 e 100 f 6

Assessment 1
on Lessons (1&2)

1. a 8 b 3.5 c 6
   d 75 e 17
2. a 5 b 15
3. $6\frac{2}{5} = 6.4$
4. 41,000

Lesson 3

1. a 6 b 5,9 c non
   d 9 e 12 f non
   g 1 h non i 3,6
   j non
2. a 28 b 2 c 200
   d 4 e non f non
   g 50,51 h 219,220 i non
   j non
3. a stay the same b increase
   c decrease d stay the same
   e increase f decrease
4. a both b median c mean
   d mean e both f mean
5. a 8 , 9 , 9and10 , 1
   b 14 , 14 , 11 , non
   c 9 , 8.5 , 7 , 14
   d 27 , 27.5 , 30 , 20and21
6. a the most common value b 2
   c 25 d more than e decrease
   f affected g not affected h median
   i mean

Assessment 2
on Lesson (3)

1. a 3 b pen c 6
   d mean e mean
2. a two modes b decreases
   c both mean and median
3. a 17 b 17
   c 16 d 10

Lesson 4

1. a 32 b 34 c 5
   d 7 e 58 f 7
   g 51
2. a 19,11,8 b 9,2,7 c 21,10,11
   d 28,21,7 e 22,11,11 f 39,31,8
3. a 20,11,9 b 10,0,10 c 21,10,11
   d 30,20,10 e 23,12,11 f 38,31,7
4. a 11,18,7 b 85,200,115
   c 1,200 , 3,600 , 2,400
   d 215 , 280 , 65
5. a maxmum - mimimum
   b box plots or dot plots
   c histogram d 8 e 12
   f 17 g 27 h affected
   i largest and smallest values
   j dispersion

Assessment 3
on Lesson (4)

1. a range b 6 c 21
   d largest and smallest value
2. a 12 b 18 c range
   d histogram
3. a 11 b 28 c 17
   d 21 e 21.5 f 18



Assessments on Units

Assessment on Unit 1

First

a) 34
b) 6
c) 131
d) 1
e) prime
f) 1
g) their product
h) (6 × 7) + (6 × 5)
i) 2 x (8 + 3)
j) $4\frac{1}{4}$

Second

a) 1044
b) 351
c) 2
d) 2
e) 2
f) 1
g) their product
h) (8 × 2) + (8 × 7)
i) $2\frac{3}{10}$

Third

1. a) 725 R2 b) 108
   c) $8\frac{5}{24}$ d) $3\frac{13}{20}$
2. 840 ÷ 15 = 56 buildings
3. GCF = 8 , LCM = 48
4. a) 8 , 15 b) none c) 1
   d) 120 e) yes
5. • GCF = 6
   • 3 red roses • 2 white roses
6. $25 - (9\frac{1}{2} + 5\frac{1}{4}) = 10\frac{1}{4}$ pounds

Assessment on Unit 2

First

a) -8
b) 0
c) 0
d) rational number
e) natural number
f) $\frac{2}{3}$
g) $-\frac{3}{10}$
h) -3.4
i) 3.7
j) 0

Second

a) -7
b) 0
c) -11.5
d) 1
e) same , opposite
f) -7 , -8
g) integer , rational
h) - 1.5
i) 8 , -8
j) 5.6

Third

① a) < b) < c) = d) <

② $|0.8|, 0.55, |-\frac{1}{2}|, -\frac{1}{4}, -\frac{3}{5}$

Accumulative Assessments 1 on Units 1-2

First

a) 6
b) 72
c) 2 × 2 × 5
d) <
e) <

Second

a) (6 × 7) + (6 × 5)
b) -2
c) -10
d) -20
e) 7 , -7

Third

a) 2825 ÷ 25 = 113 pounds
b) GCF = 9 , 9 plants

Accumulative Assessments 2 on Units 1-2

First

a) $-4\frac{2}{3}$
b) 35
c) -7
d) >
e) -5

Second

a) 0
b) -1.25
c) 2 × (8 + 6)
d) 42
e) $5\frac{3}{10}$

Third

1. a) $7\frac{19}{24}$ b) $2\frac{3}{4}$
2. a) 24 , 90   b) 6   c) 360

Assessment on Unit 3

First

a) 3   b) 3   c) 2
d) $2y - 3$ e) $25 - h$ f) 5^3
g) -   h) 15 b   i) 2
j) first choice

Second

a) $s - 10$ b) 7   c) 3n , 2n
d) $2(w - 5)$ e) subtract 5 from 3 times x
f) 6 n   g) 80   h) 3^6
i) 0   j) 1

Third

1. a) $9n + 20$
   b) ① 2   ② 9   ③ 20
2. not equivalent

Accumulative Assessments 2 on Units 1-3

First

a) 138   b) 12   c) 2
d) $x - 9$ e) 1

Second

a) 1989   b) 3.2   c) 30
d) 7 z   e) 4^2

Third

a) 5   b) $0.8 , \frac{1}{2} , |-0.25| , -\frac{1}{5} , -\frac{3}{4}$
c) $\frac{t}{15}$ or, $\frac{1}{15}t$

Accumulative Assessments 2 on Units 1-3

First

a) 36   b) a   c) 3.7
d) 2^3 e) 2^4

Second

a) 2   b) 1   c) 2
d) 8x
e) add 4 to 3 times b

Third

1. a) 34   b) 2
2. $3\frac{3}{4} - 2\frac{1}{5} = 1\frac{11}{20}$ kg

Assessment on Unit 4

First

a) 4   b) 4   c) 8
d) 3   e) $x > 4$ f) $x \leq -2$
g) $x < 0$ h) -7
i) $x < 4$ j) the second graph

Second

a) 2   b) 5   c) 4
d) 6   e) 12   f) $3x = 15$
g) $x < -6$ h) $x \geq 3$ i) $x > 0$
j) 9 belongs to both

Third

1. a) 9   b) 6
2. a) $x > 1$ or $x \geq -2$ b) $x \leq -3$ or $x < -2$

Accumulative Assessments 1 on Units 1-4

First

a 1 b −4 c −5
d 9 e 0

Second

a 2 b 7 c y − 3
d 2 e x ⩾ −8

Third

a x + 2 = 9 , x = 7
b 3x = 12 , x = 4

Accumulative Assessments 2 on Units 1-4

First

a their product b −8 c 2
d x + 5 e 8

Second

a their product
b 8 x (9 + 2) = (8 x 9) + (8 x 2)
c 3 d 1 e x < −6

Third

1 (604 + 521) ÷ 25 = 45 students
2 a 12 b 8

Assessment on Unit 5

First

a b b r
c exam result
d the number of days you go to the club
e y = 6 − x f y = 2 (x + 5)
g subtract 8 then divide by 3
h 8 i 18 j 32

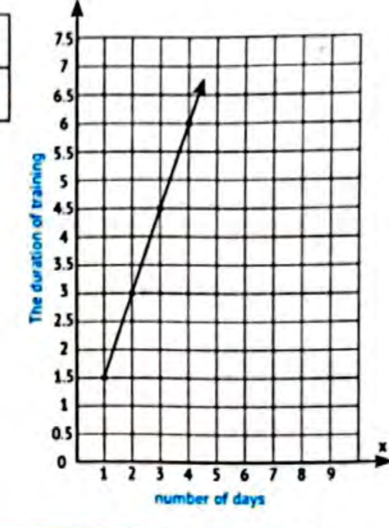
Second

a a
b ① size of garage ② number of cars
c What Ahmed saves in all week , what Ahmed saves everyday
d ① y = x + 2.4 , ② 6.4
e ① y = x + 4 , ② 4
f ① add 15 then divide by 4 , ② 5

Third

x	1	2	3	4
y	1.5	3	4.5	6

- The equation
  y = 1.5 x



Accumulative Assessments 1 on Units 1-5

First

a 1 b 0 c −3
d 4s e 3

Second

a 8 b 21 c 10
d x < 2 e multiply by 5

Third

1 a y = 150x b x c y
d 1800 pounds
2 5950 ÷ 17 = 350 cups

Accumulative Assessments 2 on Units 1-5

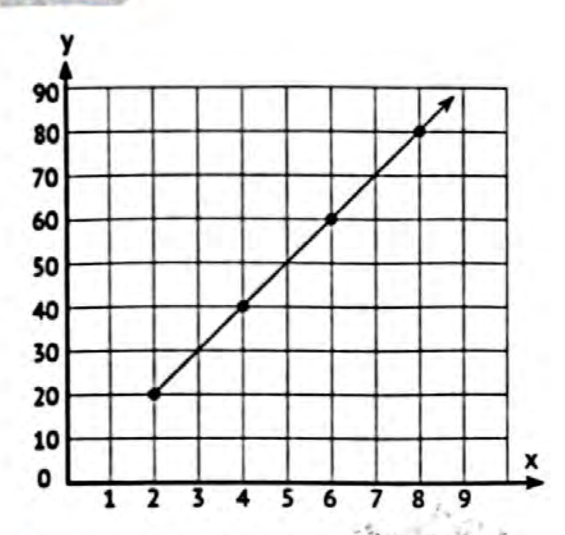
First

a 15 b −1 c (m + 18) + 3
d 3 × 3 × 3 × 3 e 3

Second

a 2 , 3 , 5 , 7 b 9 , 3 , 6 c −2 , −1 , 0 , 1
d same e 12

Third



• The equation is y = 10 x

Assessment on Unit 6

First

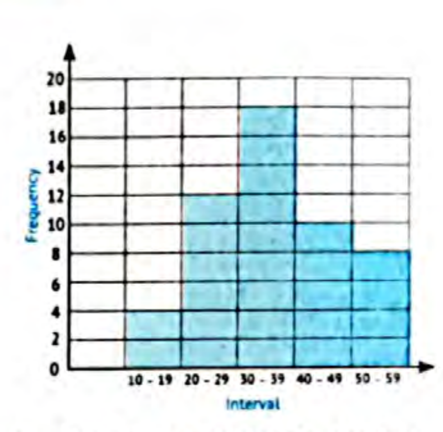
a It results in a lot of different answers
b favorite colors c ages d weight
e names f histogram g dot plot
h both bar graph and histogram
i 8 j 8

Second

a statistical , non statistical
b numerical , categorical
c numerical d numerical
e histogram f bar graph
g 7 h 1
i dot plot j histogram

Third

1



2 • order: 2 , 2 , 3 , 7 , 8 , 9 , 9 , 10 , 10 , 12
• Min: 2 • Max: 12 • Median: 8.5
• Upper: 10 • Lower: 3 , (Draw by your self)

3 a ① 3, dot plots ② 52 , both
③ 2 , dot plots ④ 1 , dot plots
⑤ 9 , dot plots

b Dot plots
① How many students weight 50 kg?
② How many students weight less than 40 kg?

• Box plots
① What is the upper quartile?
② What is the lower quartile?

Accumulative Assessments 1 on Units 1-6



First

a 1 b 0 c rational
d 3 e x ≤ −7

Second

a 6 , 4 b 65b c 7
d x > 0 e x > 1 or x ≥ 2

Third

1. a) 2 b) 10 c) 6
   d) 8 e) 3
2. a) 34 b) 29

Accumulative Assessments 2 on Units 1-6

First

a) 11 b) $-\frac{8}{4}$ c) 2

d) $\frac{1}{2}(a-7)$ e) >

Second

a) non statistical b) 6 c) 2

d) 1 e) 3b , 2b

Third

a) 3556 ÷ 14 = 254 microbuses

b) [box plot on number line 0–10]

Assessment on Unit 7

First

a) 63 b) 6 c) median

d) histogram e) range f) decrease

g) both of mean and median h) 15

i) 3 j) 7

Second

a) 5 b) 3,5 c) 14

d) 18 e) mean , range

Third

1. a) 24 b) 24 c) 24
   d) 10 e) 29
2. a) 25 b) 25 c) 25
   d) 8 e) 30

Accumulative Assessments 1 on Units 1-7

First

a) 1 b) $4\frac{1}{4}$

c) −2 , −3 d) 2 (x + 7)

e) Bar graph

Second

a) 11 b) −5.9 c) x

d) x > −1 e) z , m

Third

1. a) 21 b) 10
   c) 14 d) 11
2. a) 10 b) 2 c) 6
   d) 6 e) 8

Accumulative Assessments 2 on Units 1-7

First

a) 2 × (8 + 3) b) even number c) 19

d) 6 e) Favorite colors

Second

a) 2 b) −15 c) 5 , −5

d) 3 e) words

Third

• 8 , 14 , 6 , 18 , 10

Final Revision

First

1. 27
2. 6
3. 157
4. 1
5. has only 2 factors
6. $2 \times 2 \times 3$
7. 8
8. their product
9. their product
10. 1
11. 35
12. 0
13. 11
14. even
15. $2 \times 2 \times 5$
16. 18
17. 1
18. their product
19. their product
20. 40
21. 1
22. 35
23. 25
24. 210
25. 1
26. $(6 \times 7) + (6 \times 5)$
27. $4 \times (9 + 3)$
28. 4
29. -4
30. -2
31. -15
32. 12
33. 0
34. -6
35. -1
36. 0
37. <
38. >
39. -5
40. -1
41. -8
42. <
43. 8
44. rational number
45. even number
46. natural
47. $\frac{3}{4}$
48. $-\frac{6}{1}$
49. >
50. $-\frac{8}{4}$
51. negative
52. rational
53. 5
54. $-2,-3$
55. -8
56. 3.7
57. 0
58. 2.7
59. farther from
60. 2
61. -3
62. x
63. 2
64. 5y , 2y
65. none
66. 9
67. $m - 10$
68. $60 - x$
69. $x - 5$
70. 3
71. $x + 10$
72. $2x - 3$
73. $\frac{1}{2}(a-7)$
74. $n + 7$
75. x , +
76. 4s
77. 15b
78. 4×4
79. 1
80. 1
81. 2^5
82. 0
83. =
84. >
85. 19
86. 3^3
87. 120 m
88. $5d + 20$
89. 15
90. 7
91. 2
92. 8
93. 8
94. $x > -1$
95. $x < 5$
96. $x \leqslant -7$
97. 3 doesn't belong to any of them
98. each includes all values to the left of 4
99. -9.5
100. 6
101. $x < 0$
102. w
103. a
104. distance traveled
105. the number of correct answers
106. $y = 9 - x$
107. $y = 2x + 5$
108. divide by 3
109. subtract 3 then divide by 2
110. 22
111. 0
112. results in a lot of different answers
113. favorite colors
114. favorite TV shows
115. histogram
116. dot plots
117. bar graph
118. all
119. each value is represented by a point.
120. each bar represents a number or categorical
121. the bars must touch
122. bars are used to represent data
123. both of bar graph and histogram
124. all
125. histogram
126. bar graph
127. all
128. can display numerical and categorical
129. 50
130. 5
131. 6
132. 6
133. 3
134. 6
135. two modes
136. increases
137. Both
138. 18
139. range
140. histogram
141. $-4\frac{2}{3}$
142. 0.5
143. second one
144. $x < 2$
145. $x + 2 = 9$
146. 6
147. 9
148. 3
149. 5
150. 53
151. none
152. mean
153. decrease
154. 9
155. 35
156. 12

Second

1. 48
2. 9
3. 1989
4. 4886
5. 2
6. 2
7. 2
8. 3
9. 11
10. 2 , 3 , 5 , 7
11. 70
12. 1
13. their product
14. prime
15. 2
16. 2
17. prime number

18 2 , 2 , 7
19 1
20 their product
21 5 , 3 , 5 , 6
22 7 , 2 , 4
23 9 , 2 , 8 , 8
24 9 , 4 , 6
25 the same distance \ different
26 – 10
27 – 8
28 0
29 1
30 1
31 0
32 1
33 0
34 – 1
35 0
36 – 2 , – 1 , 0 , 1
37 -1, -2, -3
38 – 1,0,1,2
39 -1.5
40 integer , rational
41 -7
42 – 7 ,-8
43 – 5 ,-6
44 natural integer , rational
45 rational
46 $-\frac{5}{2}$
47 – 1.75
48 5
49 $\frac{7}{9}$
50 $\frac{3}{4}$
51 0.03
52 0.7
53 5 , – 5
54 7
55 9
56 – 4
57 18
58 equal
59 x
60 3
61 2
62 6 × ,2x
63 3.2
64 3b
65 z + 36
66 x – 5
67 m + 12
68 12 – d
69 7z
70 five times a increased by seven
71 4s
72 45
73 81
74 not equal
75 33
76 s-10
77 7
78 3n,2n
79 2 (w – 5)
80 80
81 base , exponent
82 4^2
83 6^3
84 7^2
85 4^5
86 6 , 4
87 4
88 4
89 3^6
90 0
91 1
92 8
93 7 × 7
94 8
95 x + 1 = 8,7
96 5
97 11
98 2
99 9
100 4
101 3
102 5
103 3
104 x < – 6
105 6 belongs to both
106 x > – 1
107 x < 2
108 x>-9
109 r , e
110 a
111 number of box , the price of box
112 m
113 x , y , 300
114 add 4
115 6
116 3
117 3
118 greatest value – smallest value
119 dot plots or box plots
120 histogram
121 8
122 15 – 3 = 12
123 17
124 27
125 Mean , range
126 10
127 18

Third

1 a 95   b 288   c 442 R5
d 49   e 629R17   f 632

2 a 35 bags   b 21 trays
c 2825 ÷ 25 = 113 , 113 × 36 = 4068 pounds
d 45 × 84 = 3780 , 3780 ÷ 12 = 315 books
e 32 × 5 = 160 pencils
4 x 16 = 64 pencils
Total = 160 + 64 = 224 pencils
Each friend = 224 ÷ 8 = 28 pencils
f each class = 1125 ÷ 25 = 45 students

3 a 12 , 45   b 3   c 3
d 180   e no

4 a 10 , 21   b none   c 1
d 210   e yes

5 10

6 greatest 8
2 oranges , 3 apples

7 14 groups
2 pens , 3 notes

8 GCF = 8 , LCM = 48

9 a $6\frac{5}{6}$ b $10\frac{9}{20}$
c $1\frac{3}{20}$ d $3\frac{3}{4}$

10 $21\frac{1}{4}$

11 $18\frac{3}{4}$

12 $1\frac{11}{20}$

13 $4\frac{1}{10}$

14 a <   b <   c <
d >   e <   f <
g =   h <   i <

15 **a** Ascending: – 17 , – 9, | – 3 | , 8 , | 12|

Descending: | 12 | , 8, | – 3 | , – 9 , 17

b Ascending: $-\frac{3}{4}, \frac{1}{4}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}$

Descending: $\frac{3}{4}, \frac{5}{8}, \frac{1}{2}, \frac{1}{4}, -\frac{3}{4}$

16 **a** 12 **b** 34 **c** 12
d 22 **e** 18 **f** 5
g 19 **h** 2 **i** 3

17 **a** 3 **b** 3
c 21 **d** 15

18 **a** $\frac{t}{15}$ **b** 5h + 10 **c** 10 p – 325

19 **a** 19 **b** 17
c 15 **d** 18

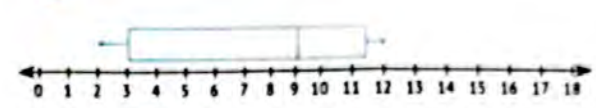
20 **a** y = 150x **b** x
c y **d** 1800

21 **a** y = x – 50 **b** x
c y **d** 370

22 20 , 40 , 70 , 90 , y = 10x

23 8 , 14 , 6 , 18 , 10

24 **a** 2 , 2 , 3 , 7 , 8 , 9 , 9 , 10 , 10 , 12
b 3 **c** 8.5
d 10
e



25 130

26 **a** 2 **b** 4 **c** 10
d 15 **e** 18

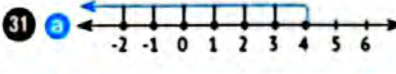
27 **a** 23 **b** 22 **c** 21
d 10 **e** 30

28 **a** 8 , 9 , (9 , 10) , 1
b 14 , 14 , 11 , 19
c 9 , 8.5 , 7 , 14
d 27 , 27.5 , 30 , (20,21)

29 **a** 2 **b** 3 **c** 1

30 **a** 2 **b** 4
c 3 **d** 1

31 **a**



b -3 -2 -1 0 1 2 3 4

Model Exams

Model (1)

First

a) 1　b) $4\frac{1}{4}$　c) -3
d) x -5　e) 1
f) results in a lot of different answer
g) bars are used to represent data

Second

a) 48　b) 2　c) x
d) m + 12　e) 81　f) x > -1
g) 8
h) numerical,categorical

Third

a) -5　b) $-\frac{6}{1}$　c) 15
d) $x \leq -1$　e) w　f) 50
g) 12

Fourth

① a) a – 247　b) $6\frac{3}{10}$
② a) 10, 21　b) none　c) 1
d) 210　e) yes
③ Answer by yourself. ④ Answer by yourself.

Model (2)

First

a) their product　b) (6 × 7) + (6 × 5)
c) 2　d) 60 – x
e) 4 × 4　f) Favorite colors
g) bars are used to represent data.

Second

a) 9　b) 2　c) 3
d) 12 – d　e) 12　f) 4, – 4
g) Numerical
h) maximum value – minimum value

Third

a) >　b) 3.7　c) 7
d) x < 5　e) a　f) 5
g) 35

Fourth

① 58 trays
② t + 20
③ a) y = x – 70　b) 490
④ 8 , 14 , 6 , 18 , 10

Model (3)

First

a) their product　b) (7 × 2) + (7 × 9)
c) 9　d) x + 5　e) 19
f) Favorite TV shows
g) both of bar graph and histogram

Second

a) 1,989　b) integer - rational
c) 2　d) multiplying by 5 then add 7
e) not equal　f) base - exponent
g) non statistical　h) 6

Third

a) <　b) $\frac{3}{4}$　c) 5d+20
d) each including all the values to the left of 4.
e) 6　f) 6　g) decreases

Fourth

① a) 15　b) 2
② 10 , 20 , 35 , 45　y = 5x
③ – 17, – 9 , | – 3 | , 8 , | 12 |
④ Draw by yourself.

Model (4)

First

(a) 8 (b) 1
(c) m – 10 (d) > (e) 120 m
(f) histogram (g) All of the previous

Second

(a) 4,865 (b) 7,2,4 (c) 7z
(d) 3n , 2n (e) 5 (f) y
(g) Categorical (h) categorical

Third

(a) 0 (b) natural (c) $x < 0$
(d) divide by 3 (e) 22 (f) 6
(g) mean

Fourth

① 14,2 pen,3 note book
② (a) $y = x + 15$ (b) 135 LE
③ Draw by yourself.
④ (a) 2 (b) 4 (c) 10
(d) 15 (e) 18

Model (5)

First

(a) $2 \times 2 \times 3$ (b) $2\frac{3}{4}$ (c) 6
(d) $\frac{1}{2}(a - 7)$ (e) > (f) dot plot
(g) histogram

Second

(a) $(5 \times 3) + (5 \times 6)$ (b) 1
(c) 6 x ,2x (d) 45 (e) 8^3
(f) 2 (g) non statistical
(h) histogram

Third

(a) -1 (b) even number
(c) 3 doesn't belong to any of them
(d) 6 (e) $y = 2x + 5$ (f) 3
(g) none

Fourth

① (a) 45 (b) $2\frac{1}{3}$
② 130
③ x: 200, 225 y: 30, 35
$y = x + 5$ (Draw by yourself)
④ (a) 2 (b) 3 (c) 1

Model (6)

First

(a) has only two factors (b) $2 \times 2 \times 5$
(c) 5y ,2y (d) 2x –3 (e) 0
(f) bar graph (g) two modes

Second

(a) $8 \times (9 + 2) = (8 \times 9) + (8 \times 2)$
(b) 11 (c) -2 , -1 , 0 , 1 (d) 3.2
(e) 6^3 (f) 4
(g) number of books (h) 3

Third

(a) -6 (b) rational number
(c) 3 (d) -9.5
(e) $y = 9 - x$ (f) bar graph (g) 9

Fourth

① (a) 12,45 (b) 3 (c) 3
(d) 180 (e) no
② (a) 2 (b) 4
(c) 3 (d) 1
③ $21\frac{1}{4}$
④ (a) 17 (b) 21
(c) 21.5 (d) 18

Model (7)

First

(a) 1 (b) even (c) 3
(d) none (e) $x + 10$
(f) All of the previous (g) 8

Second

a 0.7
b their product
c 1
d 3 b
e 11
f x < 2
g numerical data
h mean , range

Third

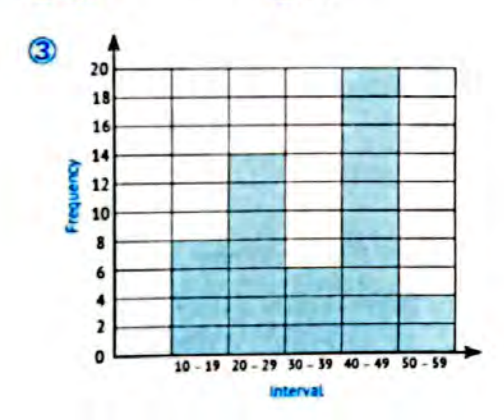
a 0
b 8
c 2^5
d 8
e the number of correct answers
f histogram
g 6

Fourth

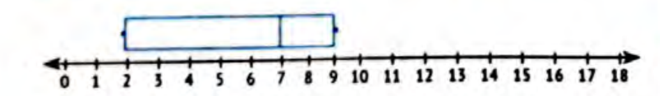
① $15 - (6\frac{2}{5} + 4\frac{1}{2}) = 4\frac{1}{10}$ km

② a 2 b 63

③



④ a 2 b 7 c 9



Model (8)

First

a 138
b 11
c $\frac{3}{8}$
d 3
e 1
f 18
g 6

Second

a 9 , 4 , 6
b -1 , 0 , 1 , 2
c z + 36
d 80
e 3
f a
g 6
h 18

Third

a 12
b >
c 8
d x ≮ -7
e distance traveled
f each information is represented by a point
g range

Fourth

① (795 ÷ 521) + 28 = 47

② a 4 b 5x , 6x
c 5 , 2 , 6 d 3

③ Draw by yourself.

④ a 24 b 23
c 22, 25 d 9

Model (9)

First

a 6
b 0
c -3
d 5 – x
e 1
f each bar represents a number or categorical
g The mean

Second

a -8
b -2.25
c s – 10
d 4^5
e price of book
f x + 1 = 8 , x = 7
g maximum value - minimum value
h 3

Third

a -15
b -8
c 7
d x ≮ 5
e a
f favorite TV shows
g 30

Fourth

① 8 , 48

② a y = 150x b x
c y d 1,800

③ a 2 b 6 c 2
d 9 e 4 (Draw by yourself)

④ 1 , 3 , 6 , 9 , 7

Model (10)

First

a 34 b 35 c 2

d 60 – x e 4 × 4

f the columns must touch g 5

Second

a 8 , 8 b the same distance ,different

c x – 5 d 7 × 7 × 7 e x < 3 or x ≤ 2

f 12 g 5 h 28

Third

a –4 b –1 c 31

d x < –2 e w f $-5\frac{2}{3}$

g 10

Fourth

① 8 , 2 orange , 3 apples ② a y = 9x

b x number of pen

c y total price , 54

③ a 95 - dot plot b 0 - dot plot

c 30 dot plot

④ 7 , 13 , 21 , 9 , 11